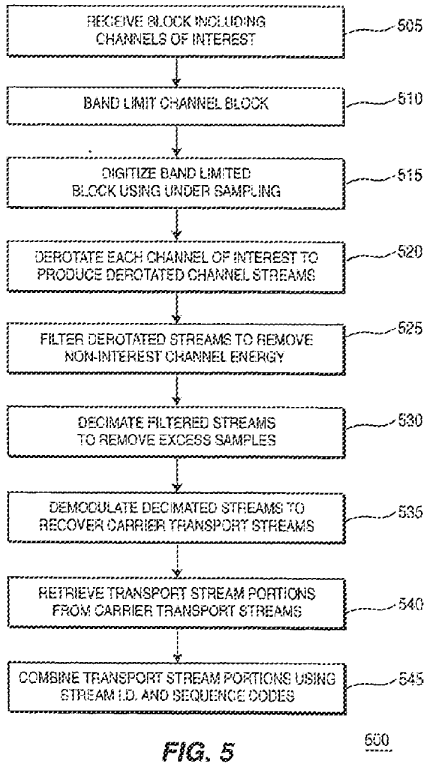
| Asserted Claims | Pugel '200 |
|---|---|
| | Pugel '200 at Fig. 5:<br>  <br><br>*FIG. 5* 500<br><br>Pugel '200 at [0021]-[0023]:<br><br>Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in |



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| Asserted Claims | Pugel '200 |
|---|---|
| | the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC.<br><br>Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.<br><br>The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136.<br><br>Pugel '200 at [0044]: |

| Asserted Claims | Pugel '200 |
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| | At step 520, each of the channels of interest within the digitized and band-limited block of channels is derotated to produce a respective derotated stream providing the channel of interest. At step 525, each of the derotated streams is filtered to remove the channel energy of other channels (i.e., the channel energy associated with channels not to be processed by the particular channel processor 130). At step 530, each of the filtered and derotated streams is decimated to remove excess samples. At step 535, each of the decimated streams is demodulated to recover the respective carrier transport streams. As previously discussed, the carrier transport streams include indicia of stream identifier and sequence code for each packet or group of packets used to form, illustratively, an MPEG transport stream. Optionally, the transport streams include channel identification and time of transmission data. The functions of steps 520-540 are discussed in more detail above with respect to the channel processors 130 of the receiver 100 of FIG. 1.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. | Pugel '200 discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at [0021]-[0023]:<br><br>Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in |

| Asserted Claims | Pugel '200 |
|---|---|
| | the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC.<br><br>Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.<br><br>The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art |

| Asserted Claims | Pugel '200 |
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| | in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. | Pugel '200 discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.<br><br>*See* claim 15, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at [0021]-[0023]:<br><br>Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC.<br><br>Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.<br><br>The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to |

| Asserted Claims | Pugel '200 |
|---|---|
| | retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. | Pugel '200 discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.<br><br>*See* claim 14, *supra*.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an | Pugel '200 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. |

| Asserted Claims | Pugel '200 |
|---|---|
| IRD and all IRDs receive the same composite signal. | *See* claim 14, *supra*.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU. | Pugel '200 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU.<br><br>*See* claim 14, *supra*.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 21[a] 21. The method of claim 14 further comprising the steps of:<br>frequency translating the selected transponder channels to a variable frequency before combining; and | Pugel '200 discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining.<br><br>*See* claim 14, 16, *supra*.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs. | Pugel '200 discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. |

| Asserted Claims | Pugel '200 |
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| | *See* claims 14, 18, *supra*.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD. | Pugel '200 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD.<br><br>*See* claims 19, 21, *supra*.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU. | Pugel '200 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU.<br><br>*See* claim 21, *supra*.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer | Pugel '200 discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. |

| Asserted Claims | Pugel '200 |
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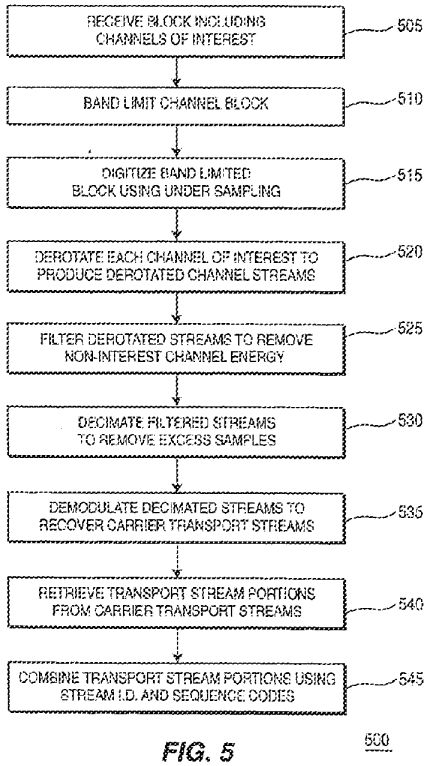
| function to the digitized broadband signal. | *See* claims 14, 15, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at Fig. 5:<br><br>  <br><br>*FIG. 5*<br><br>Pugel '200 at [0021]-[0023]: |

| Asserted Claims | Pugel '200 |
|---|---|
| | Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC.<br><br>Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.<br><br>The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136. |

| Asserted Claims | Pugel '200 |
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| | Pugel '200 at [0044]:<br><br>At step 520, each of the channels of interest within the digitized and band-limited block of channels is derotated to produce a respective derotated stream providing the channel of interest. At step 525, each of the derotated streams is filtered to remove the channel energy of other channels (i.e., the channel energy associated with channels not to be processed by the particular channel processor 130). At step 530, each of the filtered and derotated streams is decimated to remove excess samples. At step 535, each of the decimated streams is demodulated to recover the respective carrier transport streams. As previously discussed, the carrier transport streams include indicia of stream identifier and sequence code for each packet or group of packets used to form, illustratively, an MPEG transport stream. Optionally, the transport streams include channel identification and time of transmission data. The functions of steps 520-540 are discussed in more detail above with respect to the channel processors 130 of the receiver 100 of FIG. 1.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. | Pugel '200 discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.<br><br>*See* claim 14, *supra*.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Pugel '200 |
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| 36. The method of claim 14, wherein the combining is performed in the digital domain. | Pugel '200 discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at Abstract:<br><br>An apparatus and method for simultaneously processing each of a plurality of carrier signals having data modulated thereon, wherein a complete data stream is formed by extracting at least portions of at least two of the modulated signals and combining the extracted portions. Each of the portions of the complete data stream comprises a plurality of packets having associated with them respective stream identification and sequence codes, where the stream identification identifies the complete bit stream to be formed, and the sequence codes identify the order or position within the complete bitstream that the associated data packets should be inserted.<br><br>Pugel '200 at [0005]-[0006]:<br><br>The invention comprises an apparatus and method for simultaneously processing each of a plurality of carrier signals having data modulated thereon, wherein a complete data stream is formed by extracting at least portions of at least two of the modulated signals and combining the extracted portions. Each of the portions of the complete data stream comprises a plurality of packets having associated with them respective stream identification and sequence codes, where the stream identification identifies the complete bit stream to be formed, and the sequence codes identify the order or position within the complete bitstream that the associated data packets should be inserted.<br><br>An apparatus, in accordance with an embodiment of the present invention, comprises an analog to digital converter, for directly converting a plurality of carrier signals into a digital data stream; a plurality of channel processors, for simultaneously extracting from |

| Asserted Claims | Pugel '200 |
|---|---|
| | the digital data stream data carried by respective carrier signals; and a processor, for combining at least portions of the data extracted from at least two carrier signals to produce a complete bitstream, the extracted data having associated with it stream identifier and sequence code information for determining, respectively, the complete bitstream corresponding to the extracted data and the sequence within the complete bitstream of the extracted data.<br><br>Pugel '200 at [0046]:<br><br>In one embodiment of the invention, only a subset of the received channels is processed. That is, to reduce costs and complexity within the receiver 100 of FIG. 1, two or more channel processors 130 are utilized. However, the number of channel processors 130 actually utilized is less than the number of channels present within output signal S3 of the A/D converter 120. In this embodiment, channel identifier and channel transmit time information is utilized to cause at least one of the channel processors 130 to selectively process different channels at different times. In this manner, the selected at least one channel processor is caused to "hop" between different channels such that all of the data necessary to reconstruct an initial bitstream may be retrieved utilizing less than a full complement of channel processors.<br><br>Pugel '200 at Claim 1:<br><br>1. A method, comprising:<br><br>converting a plurality of carrier signals into a digital data stream;<br><br>extracting from said digital data stream, data carried by at least two carrier signals; and<br><br>combining at least portions of data extracted from said at least two carrier signals to form a complete bitstream, said extracted data having associated with it stream identifier and sequence code information for, respectively, identifying the complete bitstream |

| Asserted Claims | Pugel '200 |
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| | corresponding to the extracted data and determining the position of the extracted data within the complete bitstream.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. | Pugel '200 discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.<br><br>*See* claim 17, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at [0021]-[0023]:<br><br>Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC.<br><br>Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120. |

| Asserted Claims | Pugel '200 |
|---|---|
| | The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. | Pugel '200 discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.<br><br>*See* claims 14, 17, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at [0021]-[0023]: |

| Asserted Claims | Pugel '200 |
|---|---|
| | Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC.<br><br>Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.<br><br>The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136. |

| Asserted Claims | Pugel '200 |
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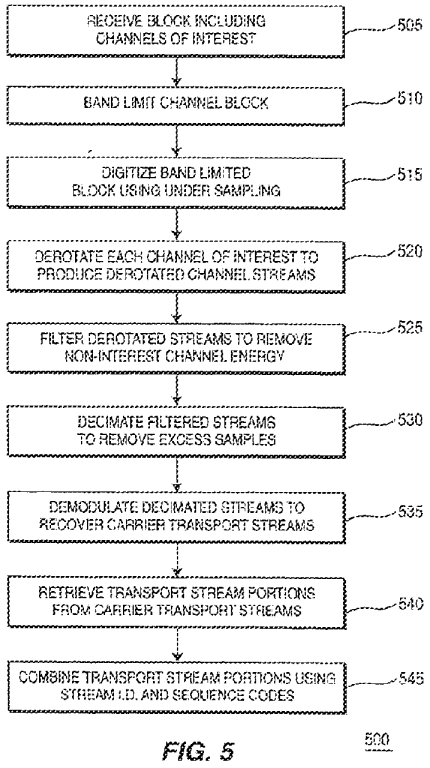
| | To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. | Pugel '200 discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.<br><br>*See* claim 38, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at [0021]-[0023]:<br><br>Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC.<br><br>Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.<br><br>The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected |

| Asserted Claims | Pugel '200 |
|---|---|
| | signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. | Pugel '200 discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at [0033]-[0034]: |

| Asserted Claims | Pugel '200 |
|---|---|
| | FIG. 3 depicts an exemplary data structure used in accordance with the principles of the present invention. Specifically, the data structure 300 comprises a packet structure having a header portion 310 and a payload portion 320.<br><br>The header portion 310 comprises standard header data 311, stream identifier data 312, and sequence code 314. In one embodiment, the header portion 310 is further augmented by other data 316.<br><br>Pugel '200 at [0036]:<br><br>In one embodiment, one or more initial data stream packets such as Moving Picture Experts Group (MPEG) transport packets are carried within the payload data portion 320 of an internet protocol (IP) packet 300. The standard header data 311 of the header portion 310 is augmented by including a stream identifier 312 and sequence code 314 indicative of, respectively, the specific initial data stream to which the one or more packets within the payload belong, and the sequence within that specific initial data stream of the one or more packets within the payload portion. It is assumed that the one or more MPEG transport packets within the payload portion of the carrier packet structure are arranged in the same order in which they are normally provided in the MPEG transport stream itself, although schemes not so arranged may also be implemented and still incorporate and embody the principles of the present invention.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. | Pugel '200 discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. |

| Asserted Claims | Pugel '200 |
|---|---|
| | *See* claim 38, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at [0033]-[0034]:<br><br>FIG. 3 depicts an exemplary data structure used in accordance with the principles of the present invention. Specifically, the data structure 300 comprises a packet structure having a header portion 310 and a payload portion 320.<br><br>The header portion 310 comprises standard header data 311, stream identifier data 312, and sequence code 314. In one embodiment, the header portion 310 is further augmented by other data 316.<br><br>Pugel '200 at [0036]:<br><br>In one embodiment, one or more initial data stream packets such as Moving Picture Experts Group (MPEG) transport packets are carried within the payload data portion 320 of an internet protocol (IP) packet 300. The standard header data 311 of the header portion 310 is augmented by including a stream identifier 312 and sequence code 314 indicative of, respectively, the specific initial data stream to which the one or more packets within the payload belong, and the sequence within that specific initial data stream of the one or more packets within the payload portion. It is assumed that the one or more MPEG transport packets within the payload portion of the carrier packet structure are arranged in the same order in which they are normally provided in the MPEG transport stream itself, although schemes not so arranged may also be implemented and still incorporate and embody the principles of the present invention.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Pugel '200 |
|---|---|
| 42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. | Pugel '200 discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Pugel '200 at Fig. 5: |

| Asserted Claims | Pugel '200 |
|---|---|
| |  <br>*FIG. 5*<br><br>Pugel '200 at [0021]-[0023]:<br><br>Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC. |

| Asserted Claims | Pugel '200 |
|---|---|
| | Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.<br><br>The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136.<br><br>Pugel '200 at [0021]-[0023]:<br><br>Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in |

| Asserted Claims | Pugel '200 |
|---|---|
| | the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC.<br><br>Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.<br><br>The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136.<br><br>Pugel '200 at [0044]: |

| Asserted Claims | Pugel '200 |
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| | At step 520, each of the channels of interest within the digitized and band-limited block of channels is derotated to produce a respective derotated stream providing the channel of interest. At step 525, each of the derotated streams is filtered to remove the channel energy of other channels (i.e., the channel energy associated with channels not to be processed by the particular channel processor 130). At step 530, each of the filtered and derotated streams is decimated to remove excess samples. At step 535, each of the decimated streams is demodulated to recover the respective carrier transport streams. As previously discussed, the carrier transport streams include indicia of stream identifier and sequence code for each packet or group of packets used to form, illustratively, an MPEG transport stream. Optionally, the transport streams include channel identification and time of transmission data. The functions of steps 520-540 are discussed in more detail above with respect to the channel processors 130 of the receiver 100 of FIG. 1.<br><br>To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

# INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,130,576 in view of Williams '419

U.S. Patent No. 6,134,419 ("Williams '419")[2] was filed on January 20, 1998 and issued on October 17, 2000. Williams '419 is a continuation-in-part of and claims priority to U.S. Application No. 08/787,336 filed on January 27, 1997. Williams '419 therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Williams '419 invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Williams '419 |
|---|---|
| 14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Williams '419 discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU.<br><br>*See, e.g.*: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

[2] Williams '419 was incorporated by reference in the '576 patent. *See* '576 patent at 2:8–25.

| Asserted Claims | Williams '419 |
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| | Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 1:10–15:<br><br>The present invention relates generally to signal distribution systems and, more particularly, to audio/visual/data signal distribution systems that distribute satellite signals typically in conjunction with standard terrestrial and/or cable signals to a plurality of individual receivers within one or more multiple dwelling units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between |

| Asserted Claims | Williams '419 |
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| | about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 2:41–55:<br><br>Furthermore, the receiving antennas or dishes associated with land-based or satellite-based wireless signal distribution systems are typically large and cumbersome. For example, C-band satellite dishes are generally in the range of four to five feet in diameter and, therefore, require a large amount of operating space. As a result, it can be difficult, if not practically impossible, to install a receiving antenna for each individual unit within a multiple dwelling unit (MDU), such as an apartment, condominium or townhome complex. Reception of a particular satellite signal is made even more difficult in MDUs when, as is generally the case, some of the individual dwelling units therein do not have any walls or outside exposure facing the direction in which the receiving antenna must be pointed, or these dwelling units are shadowed by surrounding buildings or other obstructions.<br><br>Williams '419 at 3:9–27: |

| Asserted Claims | Williams '419 |
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| | One system proposed by the European Telecommunications Standards Institute (ETSI) in the area of Satellite Master Antenna Television (SMATV) receives a QPSK modulated satellite television signal (which may be combined with terrestrial TV signals) and remodulates this signal according to a 64 quadrature amplitude modulation (64-QAM) technique. The SMATV system then sends this remodulated signal out over cable to one or more adjacent buildings. Likewise, U.S. Pat. No. 5,173,775 discloses a system that remodulates data portions of a satellite television signal from one modulation scheme to another, such as from FM to AM, for retransmission to subscribers. However, these systems do not specifically demonstrate how to propagate remodulated satellite signals and existing cable or terrestrial signals on the same cable line or other transmission channel in an efficient manner or demonstrate how to remodulate and broadcast a large number of transponder signals associated with one or more satellites over the same cable line or other transmission channel to one or more adjacent buildings.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 3:48–65: |

| Asserted Claims | Williams '419 |
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| | According to another aspect of the present invention, a signal distribution system that distributes first and second signals over a communication channel to a plurality of individual receivers includes a main receiver and a second receiver disposed at a local site for receiving the first and second signals, respectively. A transmodulator coupled to the main receiver transmodulates the first signal from a first modulation scheme, such as a QPSK modulation scheme, to a second modulation scheme, such as a 128-QAM modulation scheme, to produce a transmodulated third signal. A signal combiner coupled to the second receiver and to the transmodulator combines the transmodulated third signal at a first set of carrier frequency bands and the second signal at a second set of carrier frequency bands to produce a combined signal. A transmitter then transmits the combined signal over a cable or a wireless network in a manner capable of being received at the plurality of individual receivers.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47: |

| Asserted Claims | Williams '419 |
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| | According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 5:55–6:7:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM signals. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a |

| Asserted Claims | Williams '419 |
|---|---|
| | transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 13:13–37:<br><br>Furthermore, while the signal distribution system 10 is described herein as using a 128-QAM modulator 102, any other type of QAM modulator, such as an 8-QAM, 32-QAM, or higher order QAM modulator can be used to encode the decoded satellite signal, with the choice being dependent on how much frequency spectrum is available on a particular cable system and on how noisy the cable network tends to be which, in turn, drives the level of error protection required. In general, the higher the order of QAM encoding, the less frequency spectrum will be necessary to transmit the desired number (e.g., 32) satellite transponder signals (or other signals) over a cable network. However, the higher the order of QAM modulation, the more the transmodulated signals will be susceptible to noise while being transmitted over a cable network. Likewise, different ones of the transmodulator channels of FIG. 3 may transmodulate the received PM signal, i.e., the tuned transponder signal, using different modulation schemes. For example, a first set of the transmodulator channels may remodulate PM signals using a 128-QAM modulation technique, while a second set of transmodulator channels may use a 32-QAM modulation technique, a 64-QAM modulation technique, and so on. The choice of the modulation technique for any particular transmodulator channel may depend on, for example, the data rate of the PM signal being received, as well as other factors.<br><br>Williams '419 at 13:38–54: |

| Asserted Claims | Williams '419 |
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| | Furthermore, as noted above, modulation techniques besides QAM can be used when transmodulating the decoded satellite signal. Other such modulation techniques may include, for example, any high rate digital modulation techniques such as VSB (vestigial side band), including 8-VSB, 16-VSB etc., or QAM with trellis-coded modulation. Other modulation techniques which may be developed in the future could similarly be used without departing from the spirit and scope of the present invention. In general, the choice of a modulation technique will be driven by the reduction in bandwidth which must be accomplished by the modulation technique and by the noise susceptibility of the modulation technique. If a different modulation technique is used, however, it is understood that a different type of cable encoder will be necessary to properly transmodulate the desired transponder signals (or other received signals) for propagation over the cable network 26.<br><br>Williams '419 at 13:55–14:3:<br><br>Likewise, it is understood that signals other than QPSK modulated signals can be received at the main signal receiver 14 (or other receiver) and transmodulated for delivery over the cable network 26 using the concepts described herein. In this situation, the particulars of the transmodulator 20 will change based on the type of modulation, carrier frequencies and transmission formats associated with these different received signals. It is considered that the use of an 8-PSK (phase shift keying) modulation scheme for encoding the satellite signal and a 16-QAM or higher order QAM (32-QAM, 64-QAM etc.) scheme for encoding the cable signal may be one useful combination. It is also considered that the use of a 16-QAM scheme for encoding the satellite signal and a 32-QAM or higher order QAM scheme for encoding the cable signal may be another useful combination.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of |

| Asserted Claims | Williams '419 |
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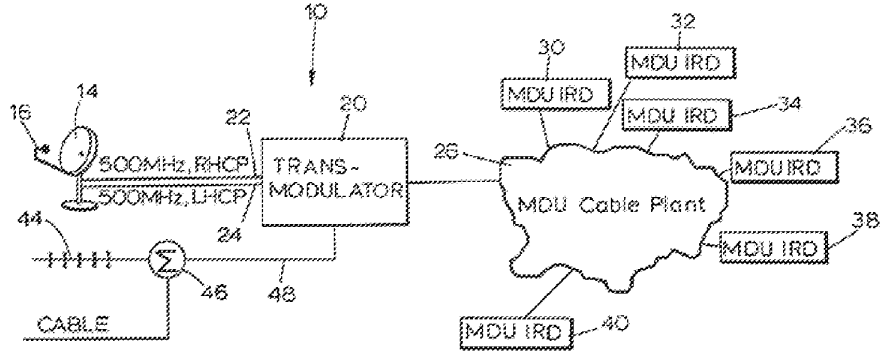
| | the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 1: |

| Asserted Claims | Williams '419 |
|---|---|
| |  <br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 14[a] communicating a transponder request signal to the ODU from the IRD; | Williams '419 discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual |

| Asserted Claims | Williams '419 |
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| | program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one |

| Asserted Claims | Williams '419 |
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| | of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 4:55–61:<br><br>In a still further aspect of this invention, an MDU adapter enables a presently available IRD used within a current signal distribution system for SFHs (SFH IRD), to be compatible with a signal distribution system for MDUs of this invention. The MDU adapter demodulates a selected one of the received MDU network signals and modulates the selected signal in a manner compatible with the SFH IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the |

| Asserted Claims | Williams '419 |
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| | transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 8:31–41:<br><br>The L-band RHCP and LHCP signals (16 each) are linked to a set of up to 32 transmodulator channels, each of which includes a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the 32 transmodulator channels will be described herein. It should be understood that a greater or lesser number of transmodulator channels may alternatively be provided.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 9:56–67:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. The control unit 72 may control, for example, tuning parameters, such as the output frequencies of the tuners 54 and may select the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R- |

| Asserted Claims | Williams '419 |
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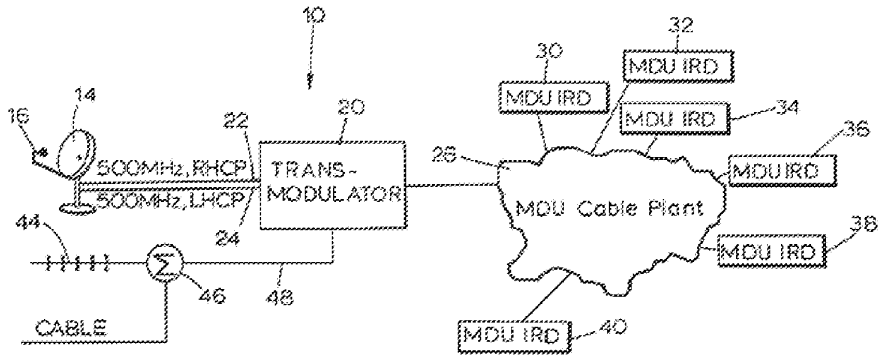
| | S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 1:<br><br>  <br><br><br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is | Williams '419 discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals.<br><br>*See, e.g.:* |

| Asserted Claims | Williams '419 |
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| responsive to the transponder request signals; | Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 6:8–27: |

| Asserted Claims | Williams '419 |
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| | The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 6:52–67:<br><br>Preferably, the transmodulator 20 transmodulates the two 500 MHz-wide QPSK-modulated downlink signals into a 128-QAM-modulated signal having 32, 6 MHz-wide channels, wherein each of the 6 MHz-wide channels corresponds to one of the 32 original transponder signals. The transmodulator 20 may then place each of these 32, 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate the received satellite signals. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at |

| Asserted Claims | Williams '419 |
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| | least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:56–67:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. The control unit 72 may control, for example, tuning parameters, such as the output frequencies of the tuners 54 and may select the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if |

| Asserted Claims | Williams '419 |
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| | desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:28–33:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 14[c] combining extracted selected transponder signals into a composite signal; | Williams '419 discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract: |

| Asserted Claims | Williams '419 |
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| | A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 4:13–32: |

| Asserted Claims | Williams '419 |
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| | According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently |

| Asserted Claims | Williams '419 |
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| | available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 5:25–40:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '419 at 7:9–36:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a standard cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater |

| Asserted Claims | Williams '419 |
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| | bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '419 at 7:37–46:<br><br>The three right-most columns of FIG. 2 illustrate methods of combining the 32, 6 MHz-wide, 128-QAM-modulated signals with existing terrestrial signals on the cable network 26. The second left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals in sequence at a band between about 806 MHz and 998 MHz directly above the common CATV channels. This configuration can be used with higher grade cable networks that propagate signals at up to 1000 MHz without significant degradation.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art |

| Asserted Claims | Williams '419 |
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| | in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. | Williams '419 discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 1:10–15:<br><br>The present invention relates generally to signal distribution systems and, more particularly, to audio/visual/data signal distribution systems that distribute satellite signals |

| Asserted Claims | Williams '419 |
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| | typically in conjunction with standard terrestrial and/or cable signals to a plurality of individual receivers within one or more multiple dwelling units.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a |

| Asserted Claims | Williams '419 |
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| | transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 4:55–61:<br><br>In a still further aspect of this invention, an MDU adapter enables a presently available IRD used within a current signal distribution system for SFHs (SFH IRD), to be compatible with a signal distribution system for MDUs of this invention. The MDU adapter demodulates a selected one of the received MDU network signals and modulates the selected signal in a manner compatible with the SFH IRD.<br><br>Williams '419 at 5:55–6:7: |

| Asserted Claims | Williams '419 |
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| | The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM signals. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '419 at 6:52–67:<br><br>Preferably, the transmodulator 20 transmodulates the two 500 MHz-wide QPSK-modulated downlink signals into a 128-QAM-modulated signal having 32, 6 MHz-wide channels, wherein each of the 6 MHz-wide channels corresponds to one of the 32 original transponder signals. The transmodulator 20 may then place each of these 32, 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate the received satellite signals. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these |

| Asserted Claims | Williams '419 |
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| | signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 13:13–37:<br><br>Furthermore, while the signal distribution system 10 is described herein as using a 128-QAM modulator 102, any other type of QAM modulator, such as an 8-QAM, 32-QAM, or higher order QAM modulator can be used to encode the decoded satellite signal, with the choice being dependent on how much frequency spectrum is available on a particular cable system and on how noisy the cable network tends to be which, in turn, drives the level of error protection required. In general, the higher the order of QAM encoding, the less frequency spectrum will be necessary to transmit the desired number (e.g., 32) satellite transponder signals (or other signals) over a cable network. However, the higher the order of QAM modulation, the more the transmodulated signals will be susceptible to noise while being transmitted over a cable network. Likewise, different ones of the transmodulator channels of FIG. 3 may transmodulate the received PM signal, i.e., the tuned transponder signal, using different modulation schemes. For example, a first set of the transmodulator channels may remodulate PM signals using a 128-QAM modulation technique, while a second set of transmodulator channels may use a 32-QAM modulation technique, a 64-QAM modulation technique, and so on. The choice of the modulation technique for any particular transmodulator channel may depend on, for example, the data rate of the PM signal being received, as well as other factors.<br><br>Williams '419 at 13:38–54: |

| Asserted Claims | Williams '419 |
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| | Furthermore, as noted above, modulation techniques besides QAM can be used when transmodulating the decoded satellite signal. Other such modulation techniques may include, for example, any high rate digital modulation techniques such as VSB (vestigial side band), including 8-VSB, 16-VSB etc., or QAM with trellis-coded modulation. Other modulation techniques which may be developed in the future could similarly be used without departing from the spirit and scope of the present invention. In general, the choice of a modulation technique will be driven by the reduction in bandwidth which must be accomplished by the modulation technique and by the noise susceptibility of the modulation technique. If a different modulation technique is used, however, it is understood that a different type of cable encoder will be necessary to properly transmodulate the desired transponder signals (or other received signals) for propagation over the cable network 26.<br><br>Williams '419 at 13:55–14:3:<br><br>Likewise, it is understood that signals other than QPSK modulated signals can be received at the main signal receiver 14 (or other receiver) and transmodulated for delivery over the cable network 26 using the concepts described herein. In this situation, the particulars of the transmodulator 20 will change based on the type of modulation, carrier frequencies and transmission formats associated with these different received signals. It is considered that the use of an 8-PSK (phase shift keying) modulation scheme for encoding the satellite signal and a 16-QAM or higher order QAM (32-QAM, 64-QAM etc.) scheme for encoding the cable signal may be one useful combination. It is also considered that the use of a 16-QAM scheme for encoding the satellite signal and a 32-QAM or higher order QAM scheme for encoding the cable signal may be another useful combination.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of |

| Asserted Claims | Williams '419 |
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| | the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 1: |

| Asserted Claims | Williams '419 |
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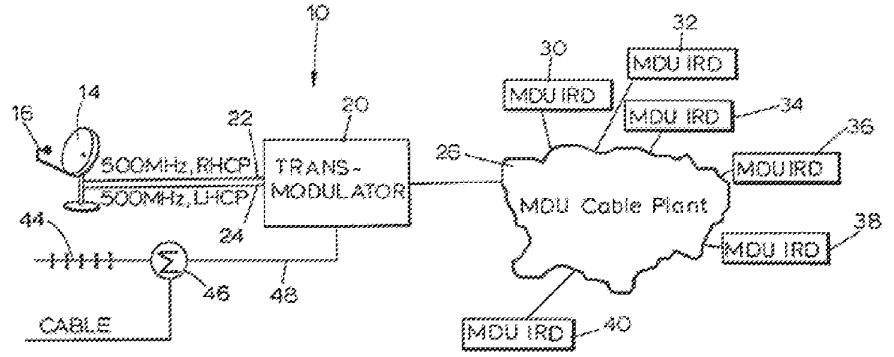
| |  <br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. | Williams '419 discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 5:55–6:7:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM signals. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder |

| Asserted Claims | Williams '419 |
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| | signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. | Williams '419 discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program |

| Asserted Claims | Williams '419 |
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| | associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 |

| Asserted Claims | Williams '419 |
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| | MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such |

| Asserted Claims | Williams '419 |
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| | groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard |

| Asserted Claims | Williams '419 |
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| | terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for |

| Asserted Claims | Williams '419 |
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| | elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27--54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2: |

| Asserted Claims | Williams '419 |
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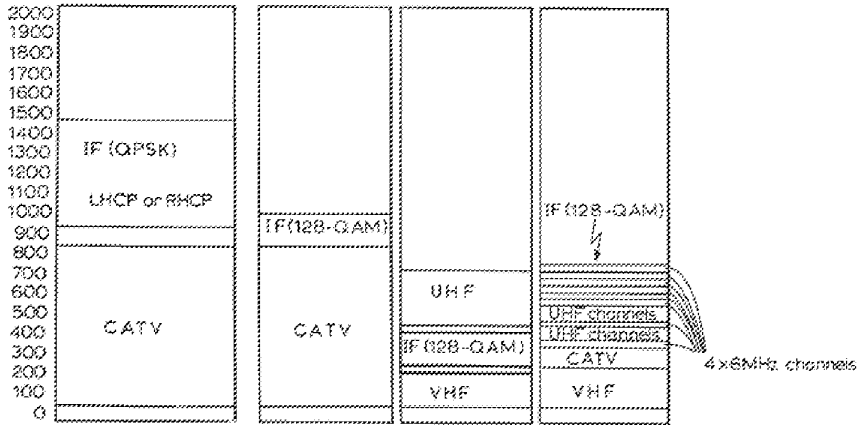
| |  <br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. | Williams '419 discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.<br><br>*See* claim 15, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. |

| Asserted Claims | Williams '419 |
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| | Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, |

| Asserted Claims | Williams '419 |
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| | for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. |

| Asserted Claims | Williams '419 |
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| | The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same |

| Asserted Claims | Williams '419 |
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| | modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter |

| Asserted Claims | Williams '419 |
|---|---|
| | 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte |

| Asserted Claims | Williams '419 |
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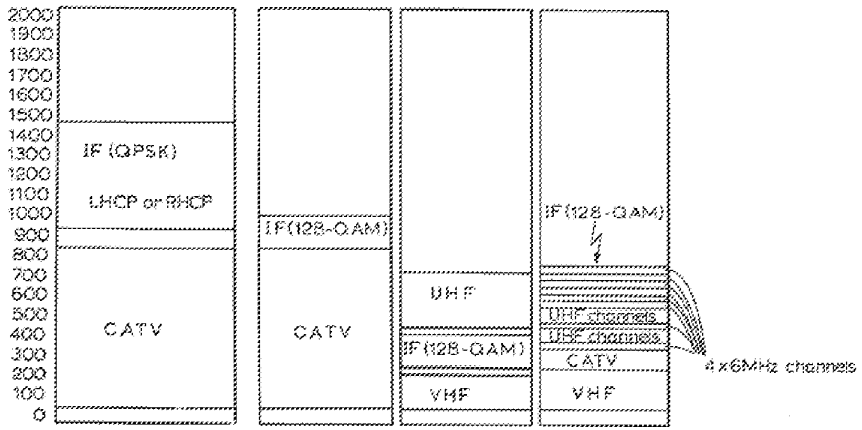
| | data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2:<br><br>  <br><br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 |

| Asserted Claims | Williams '419 |
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| | with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. | Williams '419 discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband |

| Asserted Claims | Williams '419 |
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| | signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The |

| Asserted Claims | Williams '419 |
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| | dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 4:55–61:<br><br>In a still further aspect of this invention, an MDU adapter enables a presently available IRD used within a current signal distribution system for SFHs (SFH IRD), to be compatible with a signal distribution system for MDUs of this invention. The MDU adapter demodulates a selected one of the received MDU network signals and modulates the selected signal in a manner compatible with the SFH IRD.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated |

| Asserted Claims | Williams '419 |
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| | signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:28–33:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter |

| Asserted Claims | Williams '419 |
|---|---|
| | 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at 15:54–62:<br><br>The program multiplexed data is provided to a demultiplexer 120 which is also responsive to the controller (not shown). The demultiplexer 120, which may be any standard demultiplexer, extracts one of the five to eight A-V programs from the program multiplexed data signal and provides a data stream having data pertaining to the extracted |

| Asserted Claims | Williams '419 |
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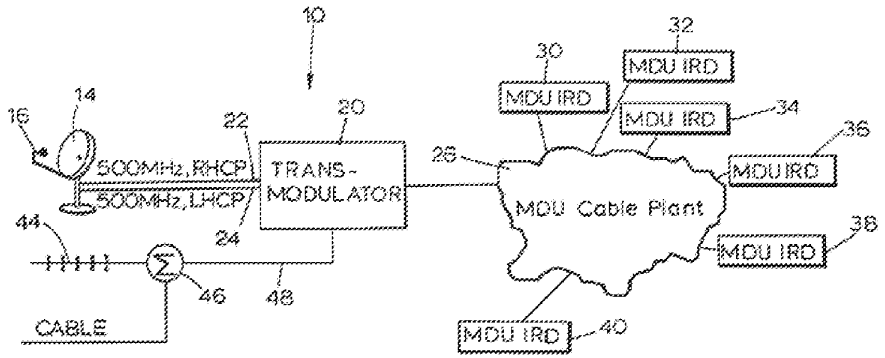
| | program (as identified by the controller) to a decoder having an MPEG video decoder 122, an MPEG audio decoder 123 and a data processor 124.<br><br>Williams '419 at Fig. 1:<br><br>  <br><br><br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. | Williams '419 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.<br><br>*See* claim 14, *supra*. |

| Asserted Claims | Williams '419 |
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| | *See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a |

| Asserted Claims | Williams '419 |
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| | transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 4:55–61:<br><br>In a still further aspect of this invention, an MDU adapter enables a presently available IRD used within a current signal distribution system for SFHs (SFH IRD), to be compatible with a signal distribution system for MDUs of this invention. The MDU adapter demodulates a selected one of the received MDU network signals and modulates the selected signal in a manner compatible with the SFH IRD.<br><br>Williams '419 at 6:8–27: |

| Asserted Claims | Williams '419 |
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| | The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 8:31–41:<br><br>The L-band RHCP and LHCP signals (16 each) are linked to a set of up to 32 transmodulator channels, each of which includes a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one |

| Asserted Claims | Williams '419 |
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| | of the 32 transmodulator channels will be described herein. It should be understood that a greater or lesser number of transmodulator channels may alternatively be provided.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:56–67:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. The control unit 72 may control, for example, tuning parameters, such as the output frequencies of the tuners 54 and may select the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of |

| Asserted Claims | Williams '419 |
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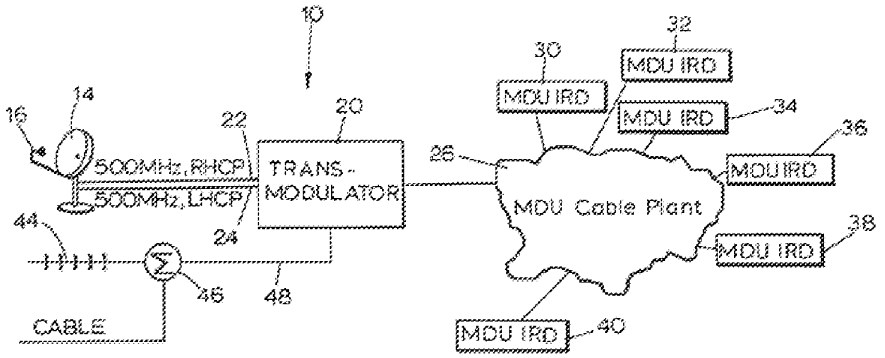
| | interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 1:<br><br>  <br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 |

| Asserted Claims | Williams '419 |
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| | with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU. | Williams '419 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:17–28:<br><br>Audio/visual/data (A-V) signal distribution systems generally rely on either a cable network or on free-space propagation for delivering A-V signals, such as television signals, to individual users or subscribers. Cable-based A-V signal distribution systems transmit one or more individual A-V signals or "channels" over wire, while free-space propagation systems transmit one or more channels over-the-air, i.e., in a wireless manner. Most large-scale cable and wireless signal distribution systems broadcast a broadband A-V signal having a plurality of individual A-V signals modulated onto one or more carrier frequencies within a discernable frequency band.<br><br>Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to |

| Asserted Claims | Williams '419 |
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| | different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 2:41–55:<br><br>Furthermore, the receiving antennas or dishes associated with land-based or satellite-based wireless signal distribution systems are typically large and cumbersome. For example, C-band satellite dishes are generally in the range of four to five feet in diameter and, therefore, require a large amount of operating space. As a result, it can be difficult, if not practically impossible, to install a receiving antenna for each individual unit within a multiple dwelling unit (MDU), such as an apartment, condominium or townhome complex. Reception of a particular satellite signal is made even more difficult in MDUs when, as is generally the case, some of the individual dwelling units therein do not have any walls or outside exposure facing the direction in which the receiving antenna must be pointed, or these dwelling units are shadowed by surrounding buildings or other obstructions.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 3:48–65: |

| Asserted Claims | Williams '419 |
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| | According to another aspect of the present invention, a signal distribution system that distributes first and second signals over a communication channel to a plurality of individual receivers includes a main receiver and a second receiver disposed at a local site for receiving the first and second signals, respectively. A transmodulator coupled to the main receiver transmodulates the first signal from a first modulation scheme, such as a QPSK modulation scheme, to a second modulation scheme, such as a 128-QAM modulation scheme, to produce a transmodulated third signal. A signal combiner coupled to the second receiver and to the transmodulator combines the transmodulated third signal at a first set of carrier frequency bands and the second signal at a second set of carrier frequency bands to produce a combined signal. A transmitter then transmits the combined signal over a cable or a wireless network in a manner capable of being received at the plurality of individual receivers.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 5:25–40: |

| Asserted Claims | Williams '419 |
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| | By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 6:52–67:<br><br>Preferably, the transmodulator 20 transmodulates the two 500 MHz-wide QPSK-modulated downlink signals into a 128-QAM-modulated signal having 32, 6 MHz-wide |

| Asserted Claims | Williams '419 |
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| | channels, wherein each of the 6 MHz-wide channels corresponds to one of the 32 original transponder signals. The transmodulator 20 may then place each of these 32, 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate the received satellite signals. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 21[a] 21. The method of claim 14 further comprising the steps of:<br>frequency translating the selected transponder channels to a variable frequency before combining; and | Williams '419 discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining.<br><br>*See* claims 14, 16, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. |

| Asserted Claims | Williams '419 |
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| | Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, |

| Asserted Claims | Williams '419 |
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| | for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. |

| Asserted Claims | Williams '419 |
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| | The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same |

| Asserted Claims | Williams '419 |
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| | modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter |

| Asserted Claims | Williams '419 |
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| | 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte |

| Asserted Claims | Williams '419 |
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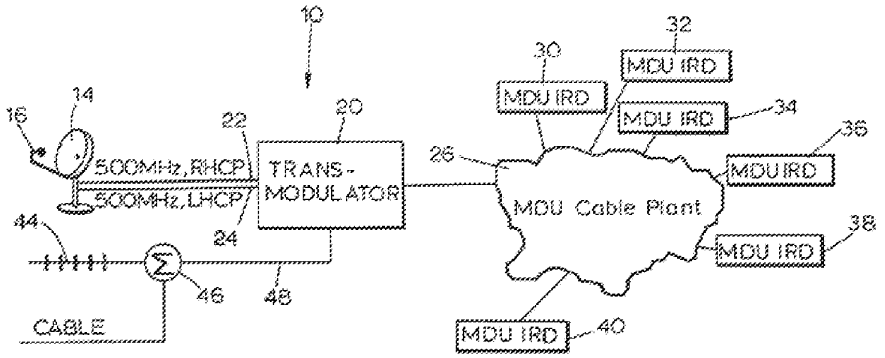
| | data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 1:<br><br>  <br><br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Williams '419 |
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| 21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs. | Williams '419 discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs.<br><br>*See* claims 14, 18, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is |

| Asserted Claims | Williams '419 |
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| | smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated |

| Asserted Claims | Williams '419 |
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| | signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 4:55–61:<br><br>In a still further aspect of this invention, an MDU adapter enables a presently available IRD used within a current signal distribution system for SFHs (SFH IRD), to be compatible with a signal distribution system for MDUs of this invention. The MDU adapter demodulates a selected one of the received MDU network signals and modulates the selected signal in a manner compatible with the SFH IRD.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a |

| Asserted Claims | Williams '419 |
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| | signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:28–33:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 14:27–54: |

| Asserted Claims | Williams '419 |
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| | The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at 15:54–62:<br><br>The program multiplexed data is provided to a demultiplexer 120 which is also responsive to the controller (not shown). The demultiplexer 120, which may be any standard demultiplexer, extracts one of the five to eight A-V programs from the program multiplexed data signal and provides a data stream having data pertaining to the extracted program (as identified by the controller) to a decoder having an MPEG video decoder 122, an MPEG audio decoder 123 and a data processor 124.<br><br>Williams '419 at Fig. 1: |

| Asserted Claims | Williams '419 |
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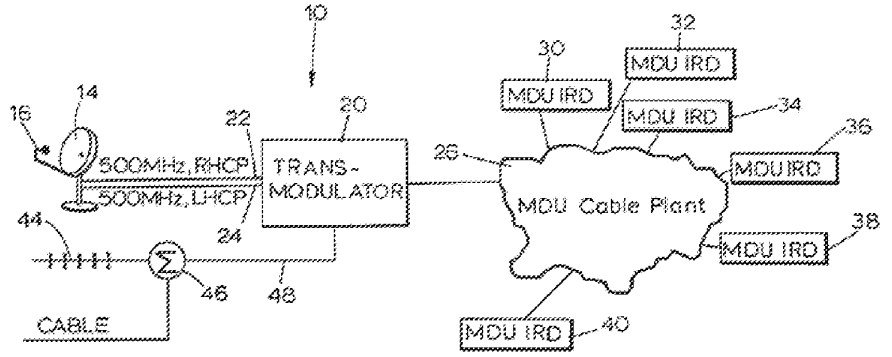
| |  <br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD. | Williams '419 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD.<br><br>*See* claims 19, 21, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna |

| Asserted Claims | Williams '419 |
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| | that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal |

| Asserted Claims | Williams '419 |
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| | distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 4:55–61:<br><br>In a still further aspect of this invention, an MDU adapter enables a presently available IRD used within a current signal distribution system for SFHs (SFH IRD), to be compatible with a signal distribution system for MDUs of this invention. The MDU adapter demodulates a selected one of the received MDU network signals and modulates the selected signal in a manner compatible with the SFH IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a |

| Asserted Claims | Williams '419 |
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| | number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 8:31–41:<br><br>The L-band RHCP and LHCP signals (16 each) are linked to a set of up to 32 transmodulator channels, each of which includes a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the 32 transmodulator channels will be described herein. It should be understood that a greater or lesser number of transmodulator channels may alternatively be provided.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder |

| Asserted Claims | Williams '419 |
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| | signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:56–67:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. The control unit 72 may control, for example, tuning parameters, such as the output frequencies of the tuners 54 and may select the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error |

| Asserted Claims | Williams '419 |
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| | during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU. | Williams '419 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU.<br><br>*See* claims 20, 21, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:17–28:<br><br>Audio/visual/data (A-V) signal distribution systems generally rely on either a cable network or on free-space propagation for delivering A-V signals, such as television signals, to individual users or subscribers. Cable-based A-V signal distribution systems transmit one or more individual A-V signals or "channels" over wire, while free-space propagation systems transmit one or more channels over-the-air, i.e., in a wireless manner. Most large-scale cable and wireless signal distribution systems broadcast a broadband A-V signal having a plurality of individual A-V signals modulated onto one or more carrier frequencies within a discernable frequency band.<br><br>Williams '419 at 1:29–43: |

| Asserted Claims | Williams '419 |
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| | Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 2:41–55:<br><br>Furthermore, the receiving antennas or dishes associated with land-based or satellite-based wireless signal distribution systems are typically large and cumbersome. For example, C-band satellite dishes are generally in the range of four to five feet in diameter and, therefore, require a large amount of operating space. As a result, it can be difficult, if not practically impossible, to install a receiving antenna for each individual unit within a multiple dwelling unit (MDU), such as an apartment, condominium or townhome complex. Reception of a particular satellite signal is made even more difficult in MDUs when, as is generally the case, some of the individual dwelling units therein do not have any walls or outside exposure facing the direction in which the receiving antenna must be pointed, or these dwelling units are shadowed by surrounding buildings or other obstructions.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is |

| Asserted Claims | Williams '419 |
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| | smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 3:48–65:<br><br>According to another aspect of the present invention, a signal distribution system that distributes first and second signals over a communication channel to a plurality of individual receivers includes a main receiver and a second receiver disposed at a local site for receiving the first and second signals, respectively. A transmodulator coupled to the main receiver transmodulates the first signal from a first modulation scheme, such as a QPSK modulation scheme, to a second modulation scheme, such as a 128-QAM modulation scheme, to produce a transmodulated third signal. A signal combiner coupled to the second receiver and to the transmodulator combines the transmodulated third signal at a first set of carrier frequency bands and the second signal at a second set of carrier frequency bands to produce a combined signal. A transmitter then transmits the combined signal over a cable or a wireless network in a manner capable of being received at the plurality of individual receivers.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the |

| Asserted Claims | Williams '419 |
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| | first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 5:25–40:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local |

| Asserted Claims | Williams '419 |
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| | sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 6:52–67:<br><br>Preferably, the transmodulator 20 transmodulates the two 500 MHz-wide QPSK-modulated downlink signals into a 128-QAM-modulated signal having 32, 6 MHz-wide channels, wherein each of the 6 MHz-wide channels corresponds to one of the 32 original transponder signals. The transmodulator 20 may then place each of these 32, 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate the received satellite signals. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Williams '419 |
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| 34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. | Williams '419 discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.<br><br>*See* claims 14, 15, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 5:55–6:7:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM signals. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a |

| Asserted Claims | Williams '419 |
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| | transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. | Williams '419 discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 9:56–67:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. The |



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| Asserted Claims | Williams '419 |
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| | control unit 72 may control, for example, tuning parameters, such as the output frequencies of the tuners 54 and may select the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26.<br><br>Williams '419 at 15:63–16:20:<br><br>The MPEG video decoder 122, which may be any standard MPEG2 video decoder commonly known in the art, operates to produce a digital video signal from the received bit stream and provides this digital signal to an NTSC encoder 125. The NTSC encoder 125, which may be any standard encoder, converts the received digital signal into an analog NTSC video signal and provides this signal to a television set 126 for display on the television screen, as is commonly known in the art. The MPEG audio decoder 123, which may be any standard audio decoder commonly known in the art, produces a digital audio signal from the received bit stream, and provides this audio bit stream to a D/A converter 127 which, in turn, provides an audio signal to the television set 126 for use in conjunction with the video signal developed by the NTSC encoder 125. The data processor 124 performs independent data processing or data functions on data within the decoded signal. The data processor 124 may, for example, decode, display and/or run web pages, software programs, etc. delivered via the satellite communication channel. In addition or in the alternative, other video, audio and/or data signals may be processed or output in known manners. Likewise, terrestrial signals may be diplexed off of the cable network 26 and provided to a tuner associated with a user television, VCR, etc. for demodulation in manners known in the art.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Williams '419 |
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| 36. The method of claim 14, wherein the combining is performed in the digital domain. | Williams '419 discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is |

| Asserted Claims | Williams '419 |
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| | smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated |

| Asserted Claims | Williams '419 |
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| | signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 4:55–61:<br><br>In a still further aspect of this invention, an MDU adapter enables a presently available IRD used within a current signal distribution system for SFHs (SFH IRD), to be compatible with a signal distribution system for MDUs of this invention. The MDU adapter demodulates a selected one of the received MDU network signals and modulates the selected signal in a manner compatible with the SFH IRD.<br><br>Williams '419 at 5:25–40:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 7:9–36:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a standard cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '419 at 7:37–46:<br><br>The three right-most columns of FIG. 2 illustrate methods of combining the 32, 6 MHz-wide, 128-QAM-modulated signals with existing terrestrial signals on the cable network 26. The second left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals in sequence at a band between about 806 MHz and 998 MHz directly above the common CATV channels. This configuration can be used with higher grade cable networks that propagate signals at up to 1000 MHz without significant degradation. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. | Williams '419 discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.<br><br>*See* claim 17, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:29–43: |

| Asserted Claims | Williams '419 |
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| | Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between |

| Asserted Claims | Williams '419 |
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| | about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the |

| Asserted Claims | Williams '419 |
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| | transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate |

| Asserted Claims | Williams '419 |
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| | frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62: |

| Asserted Claims | Williams '419 |
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| | If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error |

| Asserted Claims | Williams '419 |
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| | during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. | Williams '419 discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.<br><br>*See* claims 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program |

| Asserted Claims | Williams '419 |
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| | associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 |

| Asserted Claims | Williams '419 |
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| | MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such |

| Asserted Claims | Williams '419 |
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| | groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard |

| Asserted Claims | Williams '419 |
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| | terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for |

| Asserted Claims | Williams '419 |
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| | elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2: |

| Asserted Claims | Williams '419 |
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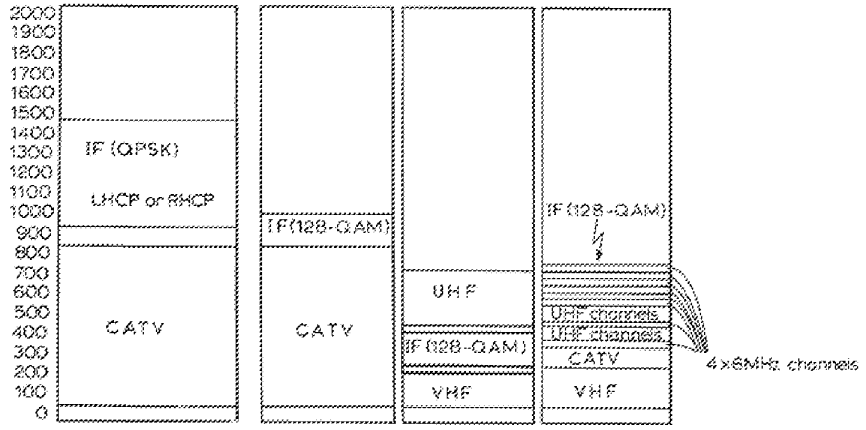
| |  <br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. | Williams '419 discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.<br><br>*See* claim 38, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. |

| Asserted Claims | Williams '419 |
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| | Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, |

| Asserted Claims | Williams '419 |
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| | for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. |

| Asserted Claims | Williams '419 |
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| | The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same |

| Asserted Claims | Williams '419 |
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| | modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter |

| Asserted Claims | Williams '419 |
|---|---|
| | 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte |

| Asserted Claims | Williams '419 |
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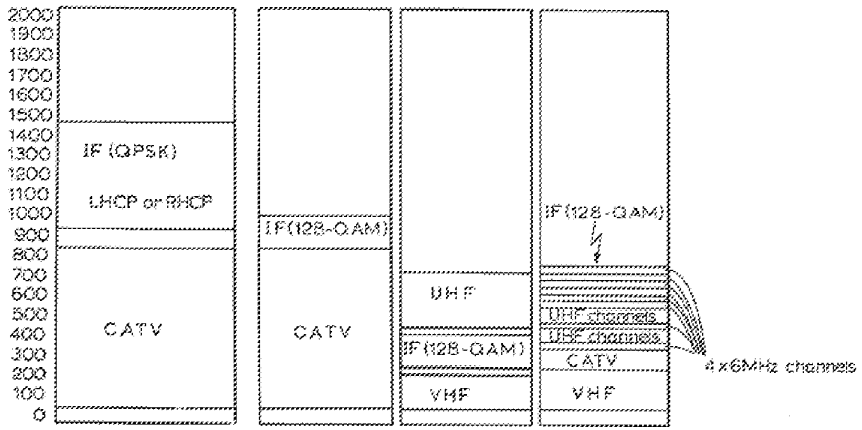
| | data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2:<br><br>  <br><br><br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 |

| Asserted Claims | Williams '419 |
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| | with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. | Williams '419 discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets |

| Asserted Claims | Williams '419 |
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| | associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50: |

| Asserted Claims | Williams '419 |
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| | The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial |

| Asserted Claims | Williams '419 |
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| | signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector |

| Asserted Claims | Williams '419 |
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| | does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54: |

| Asserted Claims | Williams '419 |
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| | The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2: |

| Asserted Claims | Williams '419 |
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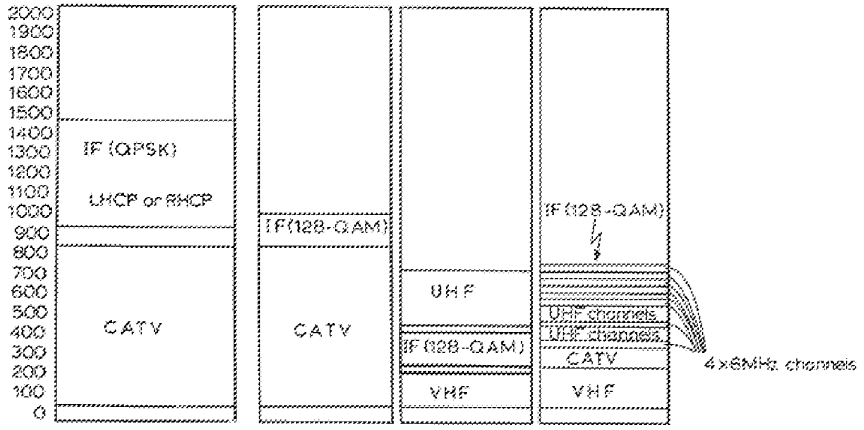
| |  <br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. | Williams '419 discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.<br><br>*See* claim 38, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. |

| Asserted Claims | Williams '419 |
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| | Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, |

| Asserted Claims | Williams '419 |
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| | for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. |

| Asserted Claims | Williams '419 |
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| | The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same |

| Asserted Claims | Williams '419 |
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| | modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter |

| Asserted Claims | Williams '419 |
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| | 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte |

| Asserted Claims | Williams '419 |
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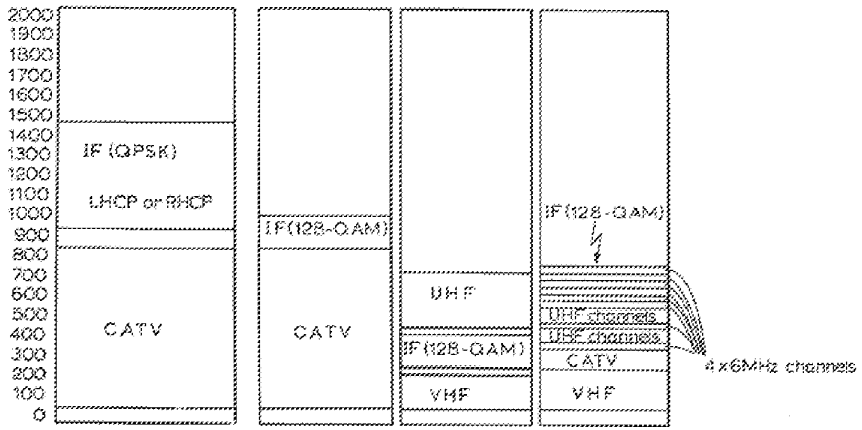
| | data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2:<br><br>  <br><br><br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 |

| Asserted Claims | Williams '419 |
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| | with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. | Williams '419 discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 5:55–6:7:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM signals. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down |

| Asserted Claims | Williams '419 |
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| | to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

# INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,130,576 in view of Williams '873

U.S. Patent No. 6,493,873 ("Williams '873") was filed on January 20, 1998 and issued on December 10, 2002. Williams '873 therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Williams '873 invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Williams '873 |
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| 14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Williams '873 discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU.<br><br>*See, e.g.*: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Williams '873 |
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| | Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder |

| Asserted Claims | Williams '873 |
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| | signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '873 at 2:45–59:<br><br>Furthermore, the receiving antennas or dishes associated with land-based or satellite-based wireless signal distribution systems are typically large and cumbersome. For example, C-band satellite dishes are generally in the range of four to five feet in diameter and, therefore, require a large amount of operating space. As a result, it can be difficult, if not practically impossible, to install a receiving antenna for each individual unit within a multiple dwelling unit (MDU), such as an apartment, condominium or townhome complex. Reception of a particular satellite signal is made even more difficult in MDUs when, as is generally the case, some of the individual dwelling units therein do not have any walls or outside exposure facing the direction in which the receiving antenna must be pointed, or these dwelling units are shadowed by surrounding buildings or other obstructions.<br><br>Williams '873 at 3:13–32:<br><br>One system proposed by the European Telecommunications Standards Institute (ETSI) in the area of Satellite Master Antenna Television (SMATV) receives a QPSK modulated satellite television signal (which may be combined with terrestrial TV signals) and remodulates this signal according to a 64 quadrature amplitude modulation (64-QAM) technique. The SMATV system then sends this remodulated signal out over cable to one or more adjacent buildings. Likewise, U.S. Pat. No. 5,173,775 discloses a system that remodulates data portions of a satellite television signal from one modulation scheme to another, such as from FM to AM, for retransmission to subscribers. However, these systems do not specifically demonstrate how to propagate remodulated satellite signals and existing cable or terrestrial signals on the same cable line or other transmission channel in an efficient manner or demonstrate how to remodulate and broadcast a large number of |

| Asserted Claims | Williams '873 |
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| | transponder signals associated with one or more satellites over the same cable line or other transmission channel to one or more adjacent buildings.<br><br>Williams '873 at 3:33–47:<br><br>The above-identified parent application discloses a signal redistribution system that transmodulates each of, for example, 32 received satellite transponder signals into a different modulation scheme and transmits each of these transmodulated signals, along with standard terrestrial signals, to each of a set of receivers within an MDU. The transmodulator disclosed in this application includes a separate channel having a satellite signal demodulator coupled to a signal remodulator for each of the received satellite transponder signals. As a result, this transmodulator unit tends to be expensive, especially when used in an MDU which includes fewer satellite signal receivers or subscribers than there are channels in the transmodulator unit, i.e., in MDUs that will never need all of the channels provided by the transmodulator unit.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which |

| Asserted Claims | Williams '873 |
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| | uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute |

| Asserted Claims | Williams '873 |
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| | the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the |

| Asserted Claims | Williams '873 |
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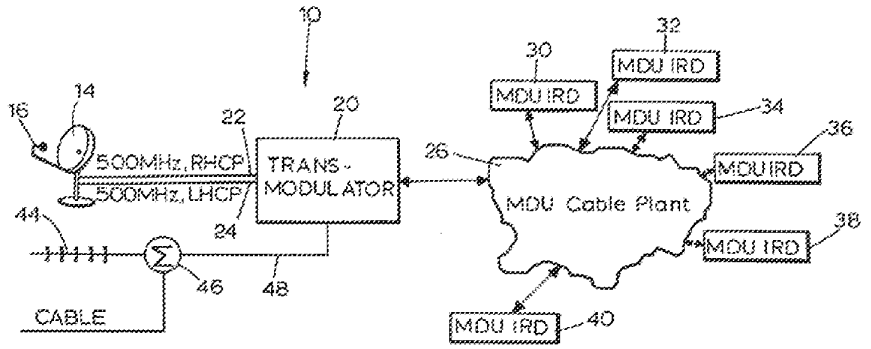
| | transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at Fig. 1:<br><br>  <br><br><br>FIG. 1<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Williams '873 |
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| 14[a] communicating a transponder request signal to the ODU from the IRD; | Williams '873 discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD.<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the |

| Asserted Claims | Williams '873 |
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| | individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 4:60–5:5:<br><br>According to a still further aspect of the present invention, a method of distributing a subset of a plurality of individual signals associated with a composite signal to multiple individual receivers includes the steps of receiving the composite signal, receiving a request signal from each of the individual receivers and choosing the subset of the plurality of the individual signals to be distributed based on the received request signals. Each of the |

| Asserted Claims | Williams '873 |
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| | subset of the plurality of the individual signals is transmodulated from a first modulation scheme to a second modulation scheme and is transmitted over a communication channel to the individual receivers.<br><br>Williams '873 at 6:35–46:<br><br>In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol |

| Asserted Claims | Williams '873 |
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| | typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 9:7–27:<br><br>The L-band RHCP and LHCP signals are each linked to a series of switches 53 associated with a set of transmodulator channels of the transmodulator 20. Preferably, the number of transmodulator channels within the transmodulator 20 is chosen in conjunction with the number of receiver units or IRDs connected to the transmodulator 20. Typically, the fewer number of IRDs, the fewer number of transmodulator channels that are necessary. Generally speaking, however, the transmodulator 20 will not require more channels than the number of IRDs being supported and, in fact, will typically require less channels because it is not likely that all of the simultaneously operating IRDs being supported by the transmodulator 20 will be tuned to different transponder signals at the same time. If desired, the number of transponder channels may be chosen using any desired statistical analysis, taking into account, for example, the number of supported IRDs, the likelihood that the IRDs will be used at the same time, the likelihood that different IRDs will be tuned to the same satellite transponder signal, etc. Of course, the transmodulator 20 may be designed to be easily upgraded to add more transmodulator channels if necessary.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches |

| Asserted Claims | Williams '873 |
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| | 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:22–35:<br><br>If desired, the control unit 72 may provide a signal via side data to each of the IRDs 30-40 specifying which transponder signals are being transmodulated and transmitted over the cable network 26 and the frequencies at which the transmodulated transponder signals are located on the cable network 26. Also, if desired, when the control unit 72 receives |

| Asserted Claims | Williams '873 |
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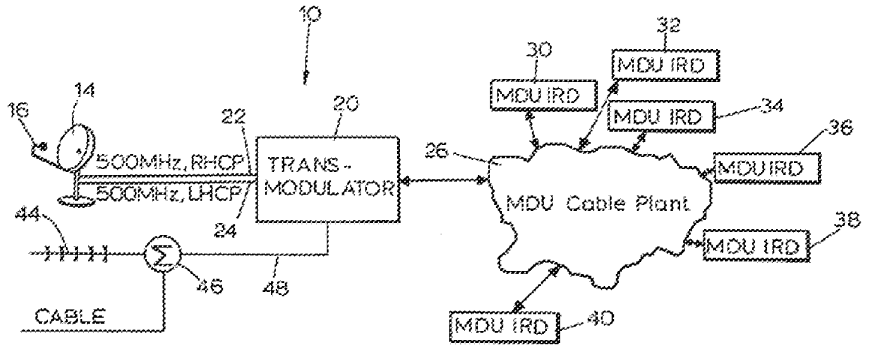
| | requests for more transponder signals than there are transmodulator channels, the control unit 72 may send a signal to one or more of the IRDs 30-40 indicating that the requested signal cannot be decoded at, the present time because all of the transmodulator channels are being used to transmodulate other transponder signals. This communication may be performed using the cable network 26 or using any other wire or wireless network.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at Fig. 1: |

| Asserted Claims | Williams '873 |
|---|---|
| |  <br>FIG. 1<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals; | Williams '873 discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals.<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract: |

| Asserted Claims | Williams '873 |
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| | A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 4:4–15: |

| Asserted Claims | Williams '873 |
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| | According to another aspect of the present invention, a signal distribution system adapted to receive a composite signal having a multiplicity of transponder signals therein includes a transmodulator that transmodulates a selected one of the transponder signals from a first modulation scheme to a second modulation scheme to produce a transmodulated signal and a transmitter that transmits the transmodulated signal over a communication channel to a plurality of individual receivers. A receiver receives a request signal from each of the plurality of individual receivers and a controller selects the selected transponder signal in response to the request signals.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 6:35–46:<br><br>In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable |

| Asserted Claims | Williams '873 |
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| | network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 9:40–48: |

| Asserted Claims | Williams '873 |
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| | The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher |

| Asserted Claims | Williams '873 |
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| | bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:1–6:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 14[c] combining extracted selected transponder signals into a composite signal; | Williams '873 discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '873 |
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| | Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a |

| Asserted Claims | Williams '873 |
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| | portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 5:30–44:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '873 at 7:48–8:8:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a 1450 MHz capable cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or |

| Asserted Claims | Williams '873 |
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| | receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '873 at 8:9–19:<br><br>The three right-most columns of FIG. 2 illustrate methods of combining selected ones of the 32, 6 MHz-wide, 128-QAM-modulated signals with existing terrestrial signals on the cable network 26. The second left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals within a band between about 804 MHz and 996 MHz directly above the common CATV channels. This configuration can be used with higher grade cable networks that propagate signals at up to 1000 MHz without significant degradation.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1. |

| Asserted Claims | Williams '873 |
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| | To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. | Williams '873 discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 1:13–18:<br><br>The present invention relates generally to signal distribution systems and, more particularly, to audio/visual/data signal distribution systems that distribute satellite signals typically in conjunction with standard terrestrial and/or cable signals to a plurality of individual receivers within one or more multiple dwelling units. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 4:4–15:<br><br>According to another aspect of the present invention, a signal distribution system adapted to receive a composite signal having a multiplicity of transponder signals therein includes a transmodulator that transmodulates a selected one of the transponder signals from a first modulation scheme to a second modulation scheme to produce a transmodulated signal and a transmitter that transmits the transmodulated signal over a communication channel to a plurality of individual receivers. A receiver receives a request signal from each of the plurality of individual receivers and a controller selects the selected transponder signal in response to the request signals.<br><br>Williams '873 at 4:16–38: |

| Asserted Claims | Williams '873 |
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| | According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program |

| Asserted Claims | Williams '873 |
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| | multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 4:60–5:5:<br><br>According to a still further aspect of the present invention, a method of distributing a subset of a plurality of individual signals associated with a composite signal to multiple individual receivers includes the steps of receiving the composite signal, receiving a request signal from each of the individual receivers and choosing the subset of the plurality of the individual signals to be distributed based on the received request signals. Each of the subset of the plurality of the individual signals is transmodulated from a first modulation scheme to a second modulation scheme and is transmitted over a communication channel to the individual receivers.<br><br>Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 7:4–23: |

| Asserted Claims | Williams '873 |
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| | Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 9:28–39:<br><br>In accordance with the present invention, the number of transmodulator channels is less than the number of transponder signals associated with the received satellite or other signal and, in a preferred embodiment, the transmodulator 20 includes up to, but less than, 32 transmodulator channels, each of which includes a switch 53, a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 received transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the transmodulator channels will be described herein.<br><br>Williams '873 at 10:40–52:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g., local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the |

| Asserted Claims | Williams '873 |
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| | level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26.<br><br>Williams '873 at 14:65–15:14:<br><br>Furthermore, as noted above, modulation techniques besides QAM can be used when transmodulating the decoded satellite signal. Other such modulation techniques may include, for example, any high rate digital modulation techniques such as VSB (vestigial side band), including 8-VSB, 16-VSB etc., or QAM with trellis-coded modulation. Other modulation techniques which may be developed in the future could similarly be used without departing from the spirit and scope of the present invention. In general, the choice of a modulation technique will be driven by the reduction in bandwidth which must be accomplished by the modulation technique and by the noise susceptibility of the modulation technique. If a different modulation technique is used, however, it is understood that a different type of cable encoder will be necessary to properly transmodulate the desired transponder signals (or other received signals) for propagation over the cable network 26.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at Fig. 1: |

| Asserted Claims | Williams '873 |
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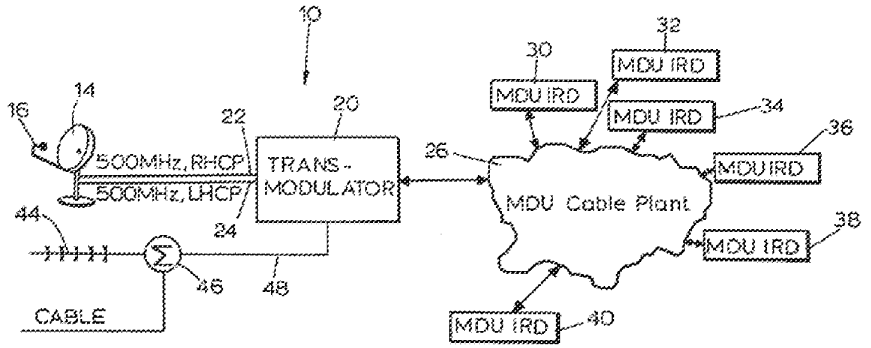
| |  <br>FIG. 1<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. | Williams '873 discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a |

| Asserted Claims | Williams '873 |
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| | selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. | Williams '873 discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program |

| Asserted Claims | Williams '873 |
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| | associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 8:20–35:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 |

| Asserted Claims | Williams '873 |
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| | may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 550 or perhaps 750 MHz without significant degradation.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:10–23:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of a number of summers 64 associated with the transmodulator 20.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the |

| Asserted Claims | Williams '873 |
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| | four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '873 at 10:40–52:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g., local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be |

| Asserted Claims | Williams '873 |
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| | digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and |

| Asserted Claims | Williams '873 |
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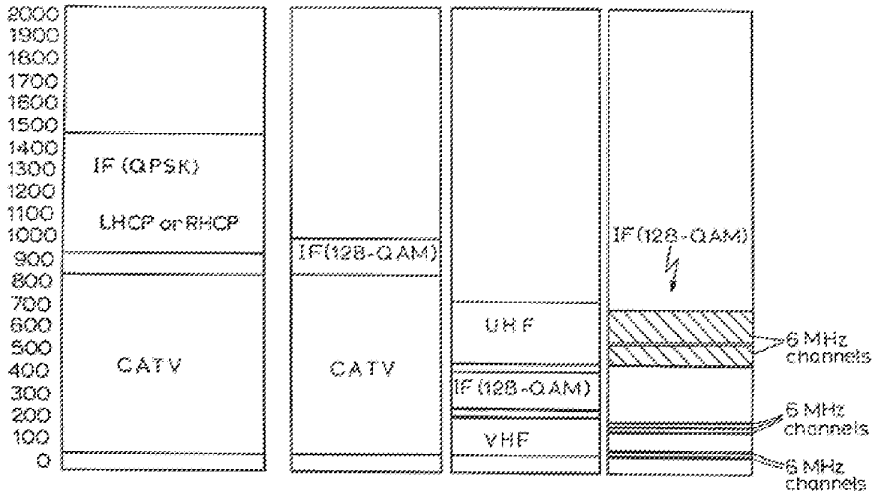
| | transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at Fig. 2:<br><br>  <br><br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 |

| Asserted Claims | Williams '873 |
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| | with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. | Williams '873 discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.<br><br>*See* claim 15, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets |

| Asserted Claims | Williams '873 |
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| | associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 8:20–35:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that |

| Asserted Claims | Williams '873 |
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| | propagate signals at frequencies up to about 550 or perhaps 750 MHz without significant degradation.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:10–23:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of a number of summers 64 associated with the transmodulator 20.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency |

| Asserted Claims | Williams '873 |
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| | band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '873 at 10:40–52:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g., local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs |

| Asserted Claims | Williams '873 |
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| | 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined |

| Asserted Claims | Williams '873 |
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| | width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable |

| Asserted Claims | Williams '873 |
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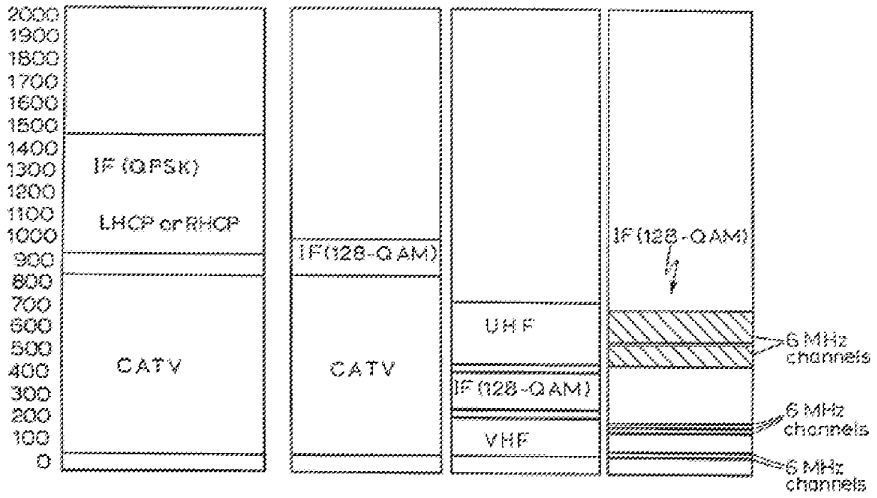
| | network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at Fig. 2:<br><br>  <br><br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Williams '873 |
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| 18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. | Williams '873 discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to |

| Asserted Claims | Williams '873 |
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| | a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 4:4–15:<br><br>According to another aspect of the present invention, a signal distribution system adapted to receive a composite signal having a multiplicity of transponder signals therein includes a transmodulator that transmodulates a selected one of the transponder signals from a first modulation scheme to a second modulation scheme to produce a transmodulated signal and a transmitter that transmits the transmodulated signal over a communication channel to a plurality of individual receivers. A receiver receives a request signal from each of the plurality of individual receivers and a controller selects the selected transponder signal in response to the request signals.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that |

| Asserted Claims | Williams '873 |
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| | receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 4:60–5:5:<br><br>According to a still further aspect of the present invention, a method of distributing a subset of a plurality of individual signals associated with a composite signal to multiple individual receivers includes the steps of receiving the composite signal, receiving a request signal from each of the individual receivers and choosing the subset of the plurality of the individual signals to be distributed based on the received request signals. Each of the subset of the plurality of the individual signals is transmodulated from a first modulation |

| Asserted Claims | Williams '873 |
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| | scheme to a second modulation scheme and is transmitted over a communication channel to the individual receivers.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first |

| Asserted Claims | Williams '873 |
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| | come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:22–35:<br><br>If desired, the control unit 72 may provide a signal via side data to each of the IRDs 30-40 specifying which transponder signals are being transmodulated and transmitted over the cable network 26 and the frequencies at which the transmodulated transponder signals are located on the cable network 26. Also, if desired, when the control unit 72 receives requests for more transponder signals than there are transmodulator channels, the control unit 72 may send a signal to one or more of the IRDs 30-40 indicating that the requested signal cannot be decoded at, the present time because all of the transmodulator channels are being used to transmodulate other transponder signals. This communication may be performed using the cable network 26 or using any other wire or wireless network.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band |

| Asserted Claims | Williams '873 |
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| | associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at 17:21–30:<br><br>The program multiplexed data is provided to a demultiplexer 120 which is also responsive to the controller 105. The demultiplexer 120, which may be any standard demultiplexer, extracts one of the five to eight A-V programs from the program multiplexed data signal and provides a data stream having data pertaining to the extracted program (as identified by the controller 105) to a decoder having an MPEG video decoder 122, an MPEG audio decoder 123 and/or a data processor 124.<br><br>Williams '873 at Fig. 1: |

| Asserted Claims | Williams '873 |
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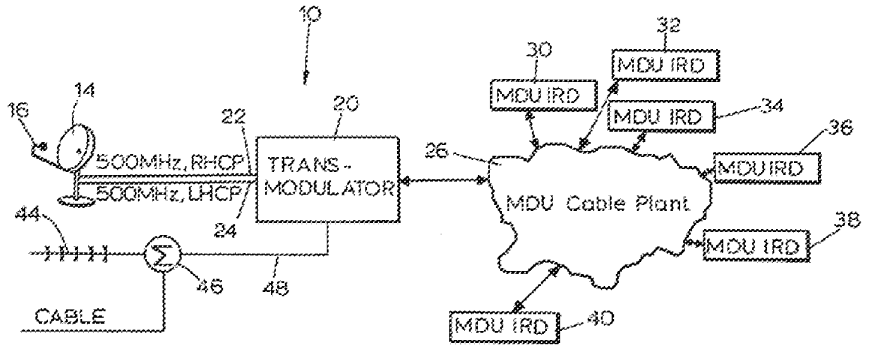
| |  <br>FIG. 1<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. | Williams '873 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract: |

| Asserted Claims | Williams '873 |
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| | A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44: |

| Asserted Claims | Williams '873 |
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| | Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 4:60–5:5:<br><br>According to a still further aspect of the present invention, a method of distributing a subset of a plurality of individual signals associated with a composite signal to multiple individual receivers includes the steps of receiving the composite signal, receiving a request signal from each of the individual receivers and choosing the subset of the plurality of the individual signals to be distributed based on the received request signals. Each of the subset of the plurality of the individual signals is transmodulated from a first modulation scheme to a second modulation scheme and is transmitted over a communication channel to the individual receivers.<br><br>Williams '873 at 6:35–46:<br><br>In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests |

| Asserted Claims | Williams '873 |
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| | for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 9:7–27:<br><br>The L-band RHCP and LHCP signals are each linked to a series of switches 53 associated with a set of transmodulator channels of the transmodulator 20. Preferably, the number of transmodulator channels within the transmodulator 20 is chosen in conjunction with the number of receiver units or IRDs connected to the transmodulator 20. Typically, the fewer |

| Asserted Claims | Williams '873 |
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| | number of IRDs, the fewer number of transmodulator channels that are necessary. Generally speaking, however, the transmodulator 20 will not require more channels than the number of IRDs being supported and, in fact, will typically require less channels because it is not likely that all of the simultaneously operating IRDs being supported by the transmodulator 20 will be tuned to different transponder signals at the same time. If desired, the number of transponder channels may be chosen using any desired statistical analysis, taking into account, for example, the number of supported IRDs, the likelihood that the IRDs will be used at the same time, the likelihood that different IRDs will be tuned to the same satellite transponder signal, etc. Of course, the transmodulator 20 may be designed to be easily upgraded to add more transmodulator channels if necessary.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as |

| Asserted Claims | Williams '873 |
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| | MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:22–35:<br><br>If desired, the control unit 72 may provide a signal via side data to each of the IRDs 30-40 specifying which transponder signals are being transmodulated and transmitted over the cable network 26 and the frequencies at which the transmodulated transponder signals are located on the cable network 26. Also, if desired, when the control unit 72 receives requests for more transponder signals than there are transmodulator channels, the control unit 72 may send a signal to one or more of the IRDs 30-40 indicating that the requested signal cannot be decoded at, the present time because all of the transmodulator channels are being used to transmodulate other transponder signals. This communication may be performed using the cable network 26 or using any other wire or wireless network.<br><br>Williams '873 at 16:5–21: |

| Asserted Claims | Williams '873 |
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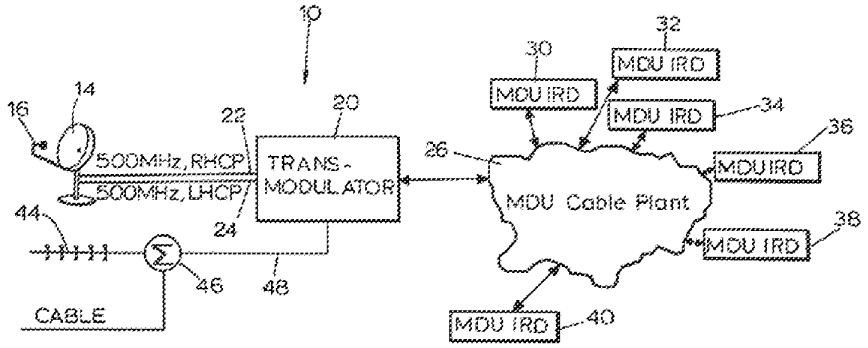
| | The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at Fig. 1:<br><br>  <br><br>FIG. 1<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 |

| Asserted Claims | Williams '873 |
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| | with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU. | Williams '873 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:20–31:<br><br>Audio/visual/data (A-V) signal distribution systems generally rely on either a cable network or on free-space propagation for delivering A-V signals, such as television signals, to individual users or subscribers. Cable-based A-V signal distribution systems transmit one or more individual A-V signals or "channels" over wire, while free-space propagation systems transmit one or more channels over-the-air, i.e., in a wireless manner. Most large-scale cable and wireless signal distribution systems broadcast a broadband A-V signal having a plurality of individual A-V signals modulated onto one or more carrier frequencies within a discernable frequency band.<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to |

| Asserted Claims | Williams '873 |
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| | different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '873 at 2:45–59:<br><br>Furthermore, the receiving antennas or dishes associated with land-based or satellite-based wireless signal distribution systems are typically large and cumbersome. For example, C-band satellite dishes are generally in the range of four to five feet in diameter and, therefore, require a large amount of operating space. As a result, it can be difficult, if not practically impossible, to install a receiving antenna for each individual unit within a multiple dwelling unit (MDU), such as an apartment, condominium or townhome complex. Reception of a particular satellite signal is made even more difficult in MDUs when, as is generally the case, some of the individual dwelling units therein do not have any walls or outside exposure facing the direction in which the receiving antenna must be pointed, or these dwelling units are shadowed by surrounding buildings or other obstructions.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which |

| Asserted Claims | Williams '873 |
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| | uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 5:30–44:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the |

| Asserted Claims | Williams '873 |
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| | transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other |

| Asserted Claims | Williams '873 |
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| | communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:22–35:<br><br>If desired, the control unit 72 may provide a signal via side data to each of the IRDs 30-40 specifying which transponder signals are being transmodulated and transmitted over the cable network 26 and the frequencies at which the transmodulated transponder signals are located on the cable network 26. Also, if desired, when the control unit 72 receives requests for more transponder signals than there are transmodulator channels, the control unit 72 may send a signal to one or more of the IRDs 30-40 indicating that the requested signal cannot be decoded at, the present time because all of the transmodulator channels |

| Asserted Claims | Williams '873 |
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| | are being used to transmodulate other transponder signals. This communication may be performed using the cable network 26 or using any other wire or wireless network.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 21[a] 21. The method of claim 14 further comprising the steps of:<br>frequency translating the selected transponder channels to a variable frequency before combining; and | Williams '873 discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining.<br><br>*See* claims 14, 16, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '873 at 1:64–2:14: |

| Asserted Claims | Williams '873 |
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| | Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device |

| Asserted Claims | Williams '873 |
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| | for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 8:20–35:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF |

| Asserted Claims | Williams '873 |
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| | band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 550 or perhaps 750 MHz without significant degradation.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:10–23:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of a number of summers 64 associated with the transmodulator 20.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide |

| Asserted Claims | Williams '873 |
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| | transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '873 at 10:40–52:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g., local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the |

| Asserted Claims | Williams '873 |
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| | control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:17–34: |

| Asserted Claims | Williams '873 |
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| | If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of |

| Asserted Claims | Williams '873 |
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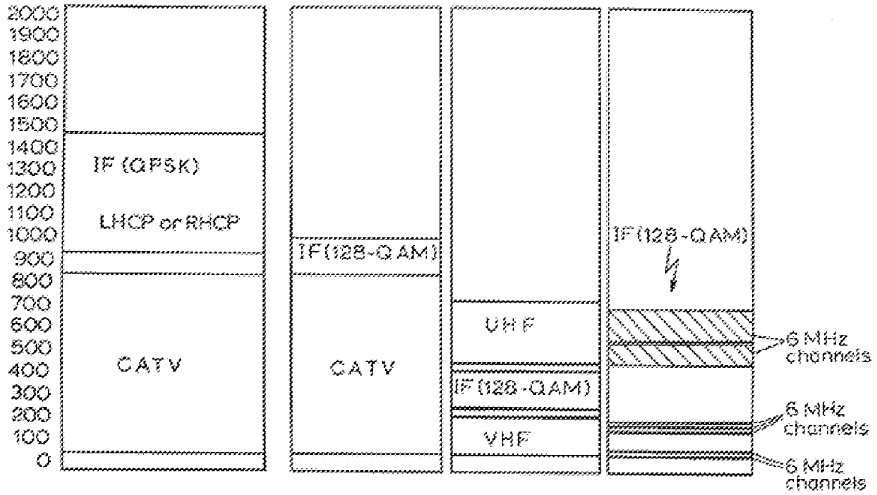
| | the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at Fig. 2:<br><br>  <br><br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Williams '873 |
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| 21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs. | Williams '873 discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs.<br><br>*See* claims 14, 18, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to |

| Asserted Claims | Williams '873 |
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| | a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 4:4–15:<br><br>According to another aspect of the present invention, a signal distribution system adapted to receive a composite signal having a multiplicity of transponder signals therein includes a transmodulator that transmodulates a selected one of the transponder signals from a first modulation scheme to a second modulation scheme to produce a transmodulated signal and a transmitter that transmits the transmodulated signal over a communication channel to a plurality of individual receivers. A receiver receives a request signal from each of the plurality of individual receivers and a controller selects the selected transponder signal in response to the request signals.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that |

| Asserted Claims | Williams '873 |
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| | receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 4:60–5:5:<br><br>According to a still further aspect of the present invention, a method of distributing a subset of a plurality of individual signals associated with a composite signal to multiple individual receivers includes the steps of receiving the composite signal, receiving a request signal from each of the individual receivers and choosing the subset of the plurality of the individual signals to be distributed based on the received request signals. Each of the subset of the plurality of the individual signals is transmodulated from a first modulation |

| Asserted Claims | Williams '873 |
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| | scheme to a second modulation scheme and is transmitted over a communication channel to the individual receivers.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first |

| Asserted Claims | Williams '873 |
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| | come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:22–35:<br><br>If desired, the control unit 72 may provide a signal via side data to each of the IRDs 30-40 specifying which transponder signals are being transmodulated and transmitted over the cable network 26 and the frequencies at which the transmodulated transponder signals are located on the cable network 26. Also, if desired, when the control unit 72 receives requests for more transponder signals than there are transmodulator channels, the control unit 72 may send a signal to one or more of the IRDs 30-40 indicating that the requested signal cannot be decoded at, the present time because all of the transmodulator channels are being used to transmodulate other transponder signals. This communication may be performed using the cable network 26 or using any other wire or wireless network.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band |

| Asserted Claims | Williams '873 |
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| | associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at 17:21–30:<br><br>The program multiplexed data is provided to a demultiplexer 120 which is also responsive to the controller 105. The demultiplexer 120, which may be any standard demultiplexer, extracts one of the five to eight A-V programs from the program multiplexed data signal and provides a data stream having data pertaining to the extracted program (as identified by the controller 105) to a decoder having an MPEG video decoder 122, an MPEG audio decoder 123 and/or a data processor 124. |

| Asserted Claims | Williams '873 |
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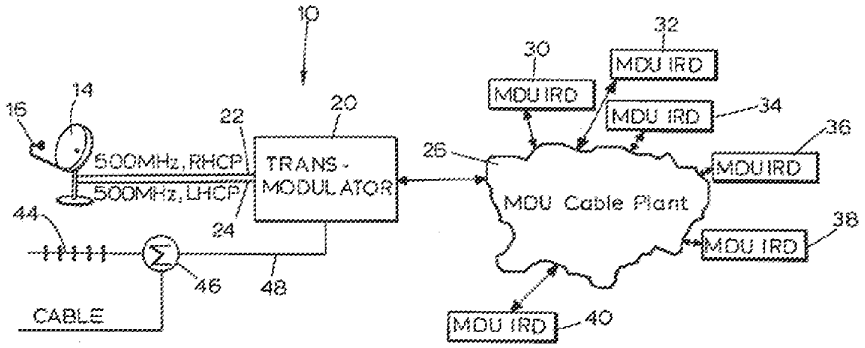
| | Williams '873 at Fig. 1:<br>  <br><br>FIG. 1<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD. | Williams '873 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD.<br><br>*See* claims 19, 21, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '873 |
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| | Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 4:60–5:5:<br><br>According to a still further aspect of the present invention, a method of distributing a subset of a plurality of individual signals associated with a composite signal to multiple individual receivers includes the steps of receiving the composite signal, receiving a request signal from each of the individual receivers and choosing the subset of the plurality of the individual signals to be distributed based on the received request signals. Each of the subset of the plurality of the individual signals is transmodulated from a first modulation scheme to a second modulation scheme and is transmitted over a communication channel to the individual receivers.<br><br>Williams '873 at 6:35–46: |

| Asserted Claims | Williams '873 |
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| | In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 9:7–27:<br><br>The L-band RHCP and LHCP signals are each linked to a series of switches 53 associated with a set of transmodulator channels of the transmodulator 20. Preferably, the number of |

| Asserted Claims | Williams '873 |
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| | transmodulator channels within the transmodulator 20 is chosen in conjunction with the number of receiver units or IRDs connected to the transmodulator 20. Typically, the fewer number of IRDs, the fewer number of transmodulator channels that are necessary. Generally speaking, however, the transmodulator 20 will not require more channels than the number of IRDs being supported and, in fact, will typically require less channels because it is not likely that all of the simultaneously operating IRDs being supported by the transmodulator 20 will be tuned to different transponder signals at the same time. If desired, the number of transponder channels may be chosen using any desired statistical analysis, taking into account, for example, the number of supported IRDs, the likelihood that the IRDs will be used at the same time, the likelihood that different IRDs will be tuned to the same satellite transponder signal, etc. Of course, the transmodulator 20 may be designed to be easily upgraded to add more transmodulator channels if necessary.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other |

| Asserted Claims | Williams '873 |
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| | wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:22–35:<br><br>If desired, the control unit 72 may provide a signal via side data to each of the IRDs 30-40 specifying which transponder signals are being transmodulated and transmitted over the cable network 26 and the frequencies at which the transmodulated transponder signals are located on the cable network 26. Also, if desired, when the control unit 72 receives requests for more transponder signals than there are transmodulator channels, the control unit 72 may send a signal to one or more of the IRDs 30-40 indicating that the requested signal cannot be decoded at, the present time because all of the transmodulator channels are being used to transmodulate other transponder signals. This communication may be performed using the cable network 26 or using any other wire or wireless network. |

| Asserted Claims | Williams '873 |
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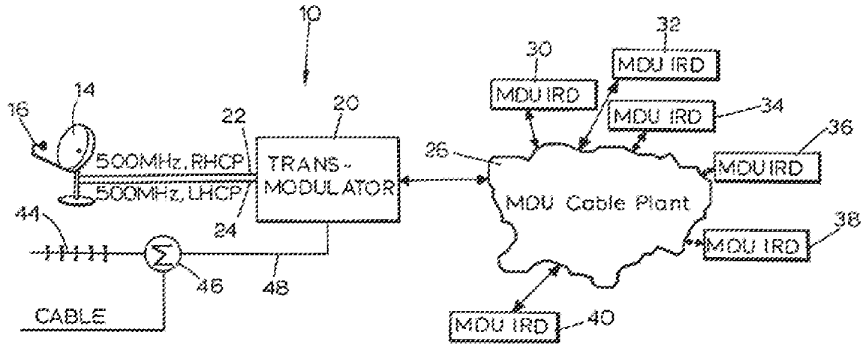
| | Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at Fig. 1:<br><br>  <br><br><br>FIG. 1 |

| Asserted Claims | Williams '873 |
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| | To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU. | Williams '873 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU.<br><br>*See* claims 20, 21, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:20–31:<br><br>Audio/visual/data (A-V) signal distribution systems generally rely on either a cable network or on free-space propagation for delivering A-V signals, such as television signals, to individual users or subscribers. Cable-based A-V signal distribution systems transmit one or more individual A-V signals or "channels" over wire, while free-space propagation systems transmit one or more channels over-the-air, i.e., in a wireless manner. Most large-scale cable and wireless signal distribution systems broadcast a broadband A-V signal having a plurality of individual A-V signals modulated onto one or more carrier frequencies within a discernable frequency band.<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number |

| Asserted Claims | Williams '873 |
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| | of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '873 at 2:45–59:<br><br>Furthermore, the receiving antennas or dishes associated with land-based or satellite-based wireless signal distribution systems are typically large and cumbersome. For example, C-band satellite dishes are generally in the range of four to five feet in diameter and, therefore, require a large amount of operating space. As a result, it can be difficult, if not practically impossible, to install a receiving antenna for each individual unit within a multiple dwelling unit (MDU), such as an apartment, condominium or townhome complex. Reception of a particular satellite signal is made even more difficult in MDUs when, as is generally the case, some of the individual dwelling units therein do not have any walls or outside exposure facing the direction in which the receiving antenna must be pointed, or these dwelling units are shadowed by surrounding buildings or other obstructions.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or |

| Asserted Claims | Williams '873 |
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| | display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 5:30–44:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel |

| Asserted Claims | Williams '873 |
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| | (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the |

| Asserted Claims | Williams '873 |
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| | cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:22–35:<br><br>If desired, the control unit 72 may provide a signal via side data to each of the IRDs 30-40 specifying which transponder signals are being transmodulated and transmitted over the cable network 26 and the frequencies at which the transmodulated transponder signals are located on the cable network 26. Also, if desired, when the control unit 72 receives requests for more transponder signals than there are transmodulator channels, the control |

| Asserted Claims | Williams '873 |
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| | unit 72 may send a signal to one or more of the IRDs 30-40 indicating that the requested signal cannot be decoded at, the present time because all of the transmodulator channels are being used to transmodulate other transponder signals. This communication may be performed using the cable network 26 or using any other wire or wireless network.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. | Williams '873 discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.<br><br>*See* claims 14, 15, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 5:59–6:11: |

| Asserted Claims | Williams '873 |
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| | The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 35. The method of claim 14, further comprising converting the selected signal to an analog signal using a | Williams '873 discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. |

| Asserted Claims | Williams '873 |
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| digital to analog converter prior to combining. | *See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 17:31–52:<br><br>The MPEG video decoder 122, which may be any standard MPEG2 video decoder commonly known in the art, operates to produce a digital video signal from the received bit stream and provides this digital signal to an NTSC encoder 125. The NTSC encoder 125, which may be any standard encoder, converts the received digital signal into an analog NTSC video signal and provides this signal to a television set 126 for display on the television screen, as is commonly known in the art. If desired, the NTSC encoder 125 may also receive signals from the controller 105 for display on the T.V. 126. Such signals may indicate to a user that, for example, a requested channel is not presently available on the |

| Asserted Claims | Williams '873 |
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| | system because the transmodulator 20 cannot assign a transmodulator channel to the satellite transponder signal associated with the requested channel at the present time. Of course, the controller 105 may have similar connections to the MPEG audio decoder 123, the MPEG video decoder 122 and/or the data processor 124. Other standard video encoders including, for example, PAL, SECAM, etc., may also be used alone or in combination.<br><br>Williams '873 at 17:53–18:4:<br><br>The MPEG audio decoder 123, which may be any standard audio decoder commonly known in the art, produces a digital audio signal from the received bit stream, and provides this audio bit stream to a D/A converter 127 which, in turn, provides an analog audio signal to the television set 126 for use in conjunction with the video signal developed by the NTSC encoder 125. The data processor 124 performs independent data processing or data functions on data within the decoded signal. The data processor 124 may, for example, decode, display and/or run web pages, software programs, etc. delivered via the satellite communication channel. In addition or in the alternative, other video, audio and/or data signals may be processed or output in known manners. Likewise, terrestrial signals may be diplexed off of the cable network 26 and provided to a tuner associated with a user television, VCR, etc. for demodulation in manners known in the art.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 36. The method of claim 14, wherein the combining is performed in the digital domain. | Williams '873 discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain.<br><br>*See* claim 14, *supra*. |

| Asserted Claims | Williams '873 |
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| | *See, e.g.*:<br><br>Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which |

| Asserted Claims | Williams '873 |
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| | uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception |

| Asserted Claims | Williams '873 |
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| | device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 5:30–44:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '873 at 7:48–8:8:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the |

| Asserted Claims | Williams '873 |
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| | RHCP or the LHCP transponder signals can be placed on a 1450 MHz capable cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '873 at 8:9–19:<br><br>The three right-most columns of FIG. 2 illustrate methods of combining selected ones of the 32, 6 MHz-wide, 128-QAM-modulated signals with existing terrestrial signals on the cable network 26. The second left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals within a band between about 804 MHz and 996 MHz directly above the common CATV channels. This configuration can be used with higher grade cable networks that propagate signals at up to 1000 MHz without significant degradation.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each |

| Asserted Claims | Williams '873 |
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| | other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. | Williams '873 discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.<br><br>*See* claim 17, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable |

| Asserted Claims | Williams '873 |
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| | network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 8:20–35:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 550 or perhaps 750 MHz without significant degradation.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:10–23:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to |

| Asserted Claims | Williams '873 |
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| | an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of a number of summers 64 associated with the transmodulator 20.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial |

| Asserted Claims | Williams '873 |
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| | signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

| Asserted Claims | Williams '873 |
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| 38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. | Williams '873 discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.<br><br>*See* claims 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder |

| Asserted Claims | Williams '873 |
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| | signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V |

| Asserted Claims | Williams '873 |
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| | channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 8:20–35:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 550 or perhaps 750 MHz without significant degradation.<br><br>Williams '873 at 9:40–48: |

| Asserted Claims | Williams '873 |
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| | The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:10–23:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of a number of summers 64 associated with the transmodulator 20.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 10:40–52:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g., local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:36–67: |

| Asserted Claims | Williams '873 |
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| | The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the |

| Asserted Claims | Williams '873 |
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| | satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. |

| Asserted Claims | Williams '873 |
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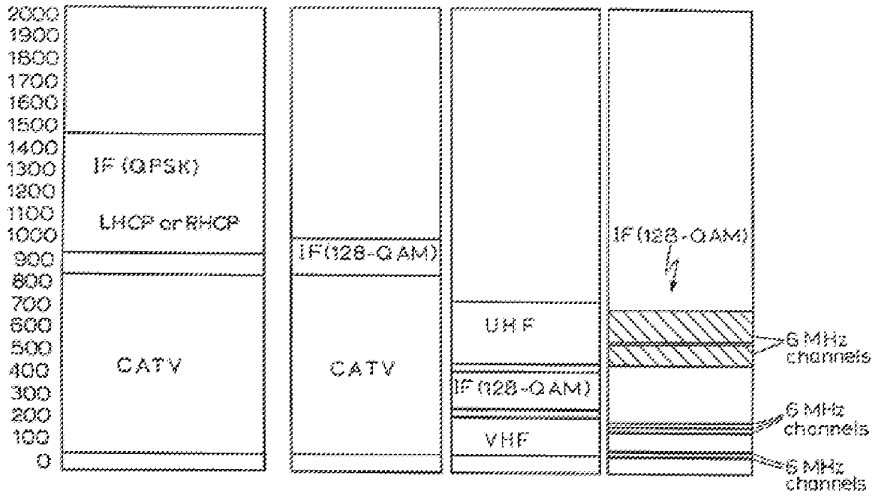
| | Williams '873 at Fig. 2:<br>  <br><br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. | Williams '873 discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.<br><br>*See* claim 38, *supra*. |

| Asserted Claims | Williams '873 |
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| | *See, e.g.*:<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 2:15–25: |

| Asserted Claims | Williams '873 |
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| | At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals |

| Asserted Claims | Williams '873 |
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| | and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at Fig. 2: |

| Asserted Claims | Williams '873 |
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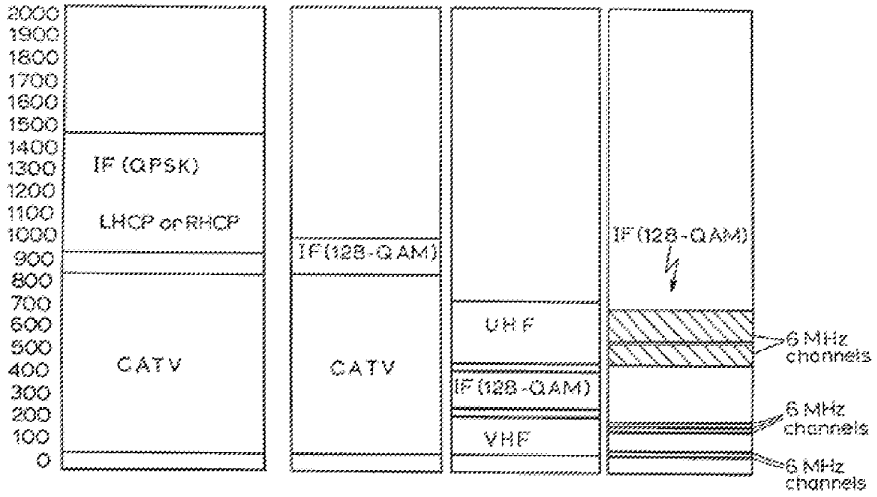
| |  <br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. | Williams '873 discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.<br><br>*See* claim 14, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the |

| Asserted Claims | Williams '873 |
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| | transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, |

| Asserted Claims | Williams '873 |
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| | in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:48–8:8:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a 1450 MHz capable cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the |

| Asserted Claims | Williams '873 |
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| | four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency |

| Asserted Claims | Williams '873 |
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| | sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:1–6:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>Williams '873 at 12:7–16:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the transmodulated signals and, if so, identify that band for use by a specific one or more of the transmodulated signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all of the transmodulated signals.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on |

| Asserted Claims | Williams '873 |
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| | the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 12:35–47:<br><br>A transmodulator control panel 74 is coupled to the control unit 72 and, preferably, includes signal strength measurement devices that indicate the relative strength of each of the satellite signals and/or each of the terrestrial signals input to the transmodulator 20. The control panel 74 may also allow an operator to choose default frequency locations for each of the transmodulated and/or terrestrial signals and may include controls that permit an installer to select the carrier frequency bands for any number of the transmodulated and/or terrestrial signals. Of course, the transmodulator control panel 74 and the control unit 72 may perform any other desired functions with respect to the transmodulator 20.<br><br>Williams '873 at 15:53–16:4:<br><br>The IRD 30 may initially scan all the channels from, for example, low carrier frequencies to high carrier frequencies, to locate the frequency bands or channels used by the selected ones of the transmodulated signals and then assign channel numbers to these located signals based on a predetermined ordering scheme used by the transmodulator 20. However, as noted above, the transmodulator 20 may actively signal the channel locations, ordering, frequency assignments, etc. of the transmodulated satellite signals and/or terrestrial signals via a communication channel (using side data) established over, for example, the cable network 26. Such a communication channel may comprise a low-speed channel that uses uncoded bits of the sync and error code bytes within the, for example, 188 byte data packets, and may be used to deliver any desired information to the IRD 30 over time, i.e., using a large number of the 188 byte data packets.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and |

| Asserted Claims | Williams '873 |
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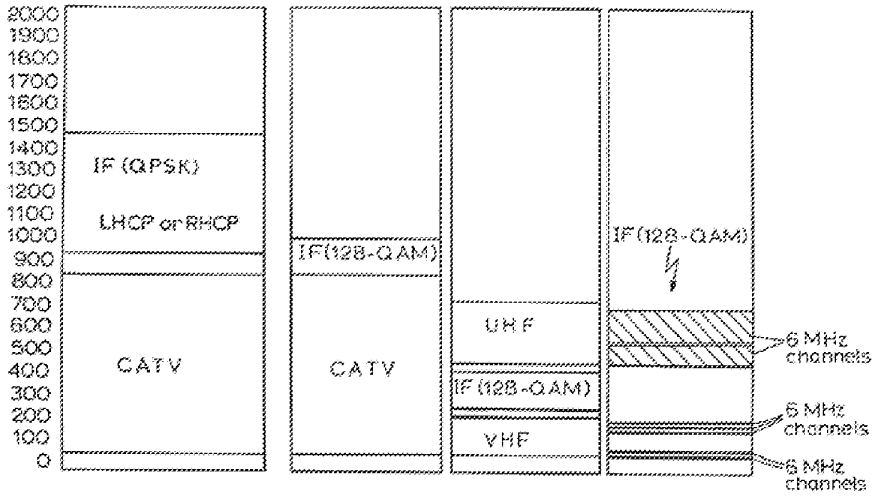
| | transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at Fig. 2:<br><br>  <br><br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 |

| Asserted Claims | Williams '873 |
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| | with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. | Williams '873 discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.<br><br>*See* claim 38, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels |

| Asserted Claims | Williams '873 |
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| | coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth |

| Asserted Claims | Williams '873 |
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| | of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 6:35–46:<br><br>In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and |

| Asserted Claims | Williams '873 |
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| | places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47: |

| Asserted Claims | Williams '873 |
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| | Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 7:48–8:8:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a 1450 MHz capable cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an |

| Asserted Claims | Williams '873 |
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| | MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '873 at 9:28–39:<br><br>In accordance with the present invention, the number of transmodulator channels is less than the number of transponder signals associated with the received satellite or other signal and, in a preferred embodiment, the transmodulator 20 includes up to, but less than, 32 transmodulator channels, each of which includes a switch 53, a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 received transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the transmodulator channels will be described herein.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide |

| Asserted Claims | Williams '873 |
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| | transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator |

| Asserted Claims | Williams '873 |
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| | channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:1–6: |

| Asserted Claims | Williams '873 |
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| | After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>Williams '873 at 12:7–16:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the transmodulated signals and, if so, identify that band for use by a specific one or more of the transmodulated signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all of the transmodulated signals.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 12:35–47: |

| Asserted Claims | Williams '873 |
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| | A transmodulator control panel 74 is coupled to the control unit 72 and, preferably, includes signal strength measurement devices that indicate the relative strength of each of the satellite signals and/or each of the terrestrial signals input to the transmodulator 20. The control panel 74 may also allow an operator to choose default frequency locations for each of the transmodulated and/or terrestrial signals and may include controls that permit an installer to select the carrier frequency bands for any number of the transmodulated and/or terrestrial signals. Of course, the transmodulator control panel 74 and the control unit 72 may perform any other desired functions with respect to the transmodulator 20.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 15:53–16:4:<br><br>The IRD 30 may initially scan all the channels from, for example, low carrier frequencies to high carrier frequencies, to locate the frequency bands or channels used by the selected ones of the transmodulated signals and then assign channel numbers to these located signals based on a predetermined ordering scheme used by the transmodulator 20. However, as noted above, the transmodulator 20 may actively signal the channel locations, ordering, frequency assignments, etc. of the transmodulated satellite signals and/or terrestrial signals via a communication channel (using side data) established over, for example, the cable network 26. Such a communication channel may comprise a low-speed channel that uses uncoded bits of the sync and error code bytes within the, for example, |

| Asserted Claims | Williams '873 |
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| | 188 byte data packets, and may be used to deliver any desired information to the IRD 30 over time, i.e., using a large number of the 188 byte data packets.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at 16:22–42:<br><br>The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This |

| Asserted Claims | Williams '873 |
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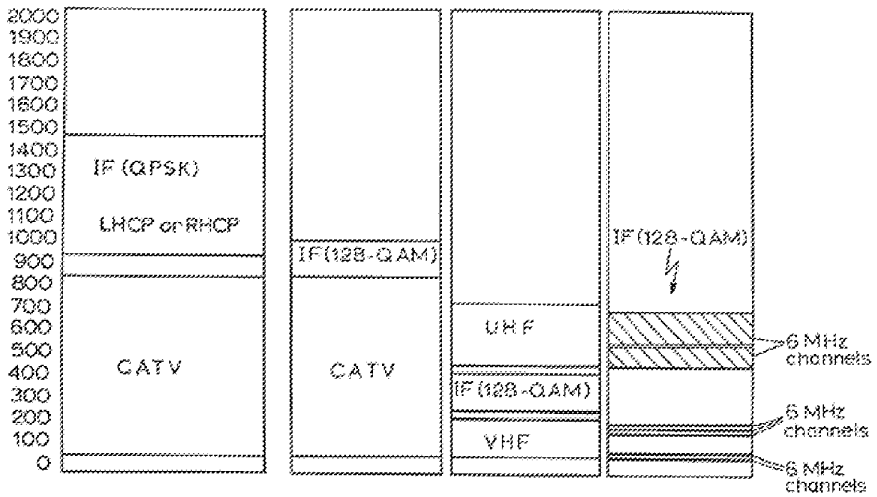
| | indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '873 at Fig. 2:<br><br>  <br><br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |
| 42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby | Williams '873 discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. |

| Asserted Claims | Williams '873 |
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| substantially removing signal information from non-selected transponder channels. | *See* claim 14, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 9:40–48: |

| Asserted Claims | Williams '873 |
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| | The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto. |

# INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Ardemagni

WO 00/03542 ("Ardemagni") was filed on June 18, 1999 and published on January 20, 2000. Ardemagni therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (b). For the reasons listed below, Ardemagni invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Ardemagni |
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| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Ardemagni discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Ardemagni at Abstract: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Ardemagni |
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| | The invention relates to an optimized system for distribution of television and telecommunication services from a peripheral node to user terminals (10, 11, 12) comprising a bi-directional switch exchange (1) connected to said peripheral node, a facility (7) for bi-directional distribution of signals connected to said exchange (1) and at least one user apparatus (9) connected to said user terminals (10, 11, 12), said exchange (1) receiving from said peripheral node the signals belonging to said television and telecommunication services and from said bi-directional distribution facility (7) a local upstream data sequence including the television channel selection signals, said exchange (1) selecting some input signals belonging to television services and reallocating and/or frequency transmodulating them in order to transmit them, in combination with a local downstream data sequence, to said signal bi-directional distribution facility (7), said user apparatus (9) processing said local downstream data sequence and generating said local upstream data sequence to be transmitted to said exchange (1) together with the upstream data and/or voice channels related to said telecommunication services.<br><br>Ardemagni at 3:5–11:<br><br>It is an object of this invention, therefore, to enable in simple, economically convenient and reliable way to utilize a single plant for distributing the concerned signals, preferably a conventional, possibly already installed MATV plant, between the peripheral node and the user terminals connected thereto, for contemporaneous distribution of land based television channels as well as other television and/or telecommunication services, also including any interactive services.<br><br>Ardemagni at 6:33–7:6:<br><br>By referring now to Figure 1 , the system according to this invention comprises a bi-directional switch exchange 1 , positioned at a building node, which receives all signals belonging to the television and telecommunication services available in network HFC2, in system 3 which receives the land based television radio frequencies, in system 4 which receives the satellite based television radio frequencies as well as in local apparatuses 5 of |

| Asserted Claims | Ardemagni |
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| | the building, such as, for instance, the Closed Circuit Television systems (CCTV) and the video intercommunication systems.<br><br>Ardemagni at Fig. 1: |

| Asserted Claims | Ardemagni |
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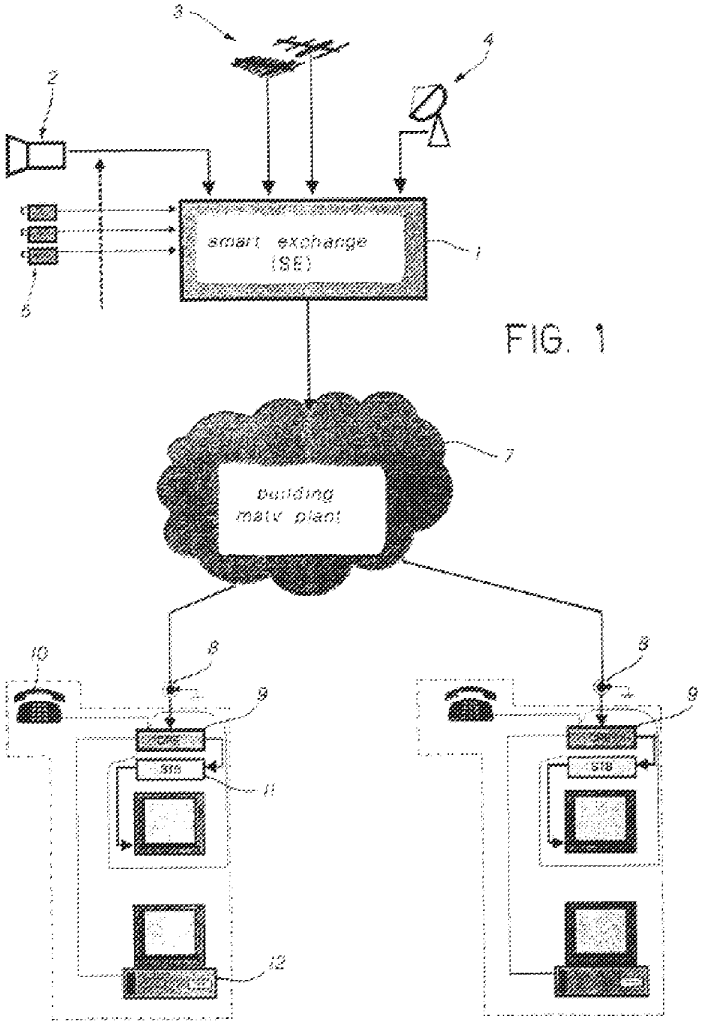
| |  FIG. 1 |

| Asserted Claims | Ardemagni |
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| | To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Ardemagni discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Ardemagni at 1:7–12:<br><br>More particularly, this invention relates to a system of the above mentioned kind that enables the already existing facilities designed for centralized distribution of land based television channels, also known as Master Antenna TV (MATV) to also be adapted, in economically convenient and reliable way, to simultaneously distribute other television and telecommunication services, also including the interactive services.<br><br>Ardemagni at 3:5–11:<br><br>It is an object of this invention, therefore, to enable in simple, economically convenient and reliable way to utilize a single plant for distributing the concerned signals, preferably a conventional, possibly already installed MATV plant, between the peripheral node and the user terminals connected thereto, for contemporaneous distribution of land based television channels as well as other television and/or telecommunication services, also including any interactive services.<br><br>Ardemagni at 5:26–28: |

| Asserted Claims | Ardemagni |
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| | Further according to this invention, said signal bi-directional distribution facility is an apparatus for centralized distribution of land based television channels or a Master Antenna TV (MATV) facility.<br><br>Ardemagni at 7:16–31:<br><br>As it will be detailedly described hereinafter, the system according to this invention allows to utilize a MATV plant or facility for conveying in bi-directional way the signals of all television and telecommunication services to the input of said exchange, thereby supplying them to all active user terminals (10, 11 , 12), by means of a selection operation, advanced up to the level of said exchange 1 , among the specific non land based television channels as requested by active STB terminals 11. In particular, when a user selects a specific satellite or cable based television channel on his STB terminal 11 , the selection signal returns to the exchange 1 in order to redefine its switching pattern and to supply the concerned STB terminal 11 with only the selected television channel, rather than all available channels. When it is considered that STB terminal 11 could also receive signals belonging to more than one television services, it evidently appears that a reduction is obtained in terms of occupation of the band of the transmission channel interposed between the building node and the individual socket 8.<br><br>Ardemagni at 8:1–9:<br><br>In particular, aiming at making the system according to this invention compatible with the distribution of signals belonging to land based television channels to users not having connections with other television services and consequently are not provided with STB terminals 11 , according to the preferred embodiment of this invention, all these signals are conveyed by the MATV facility 7, thereby eliminating the signals replicated with the worst Signal-to-Noise Ratio (SNR) at the most, and maintaining the selection at a level corresponding to the user television set.<br><br>Ardemagni at 8:26–35: |

| Asserted Claims | Ardemagni |
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| | In this respect, the signals conveyed by said facility 7 from the exchange 1 to the various user apparatuses 9, by which the so-called "downstream" flow or channel is formed, comprise all signals belonging to land based television channels, coming from the receiver system 3 for the land based television radio frequencies, all signals belonging to downstream data and/or voice channels corresponding to telecommunication services, the signals belonging to satellite based and/or cable based television channels as selected by active user STB terminals 11 and lastly signals generated by exchange 1 for controlling said active STB terminals 11.<br><br>Ardemagni at 16:12–21:<br><br>It will also be apparent to those skilled in the art that a system according to this invention can easily be modified and/or adapted to process signals belonging to further television and/or telecommunication services. By way of exemplification, as it is shown in Figures 4 and 5, CCTV systems 5 can be provided such that, by suitable insertion of signals related to video and/or audio and/or control functions into channels upstream or downstream of said exchange 1 , they can be transmitted unaltered along said MATV facility 7 or they can be transmitted only if activated by the user and reallocated in frequency by said exchange 1.<br><br>Ardemagni at 16:33–17:10:<br><br>Said already existing or newly realized MATV facility 7 appears to be completely transparent to the usual broadcast or diffusion of land based television channels. In view of the above, exchange 1 is compatible with the usual services offered by said MATV facility 7 and any user not desiring to be connected to further television or telecommunication services continues anyway to utilize the land based signals. On the opposite side, any user desiring to be connected to further services should provide his own coaxial socket 8 (any one in his flat) with the concerned user apparatus 9, which acts as a "concentrator" in |

| Asserted Claims | Ardemagni |
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| | respect of the various user terminals (10, 11 , 12) installed in the concerned apartment. The connection between user apparatus 9 and said user terminals (10, 11 , 12) is realized by means of standard interface units (telephone cable, coaxial cable or infrared coupling), but it is possible to realize a radio connection, as well.<br><br>Ardemagni at 17:18–23:<br><br>The above exchange 1 is coupled, on one side, to the various input services outcoming from the antennas and/or from external cables, namely the land based television channels, the HFC telecommunication services, the satellite based television channels and, on the other side, namely the output side, to coaxial cable of said MATV distribution facility 7.<br><br>Ardemagni at 17:29–18:2:<br><br>Apparatus 9 performs the function to "dialogue" with said exchange 1 (in order to manage the MATV facility 7 in a suitable form to convey a plurality of interactive and not-interactive television services) and, at the same time, it is "open" to conveying telecommunication signals so that said MATV facility 7 can be effectively considered as a natural completion of radio based point-multipoint or PTM access systems presently studied, in order to easily apply such PTM systems in urban areas where the users are to a large extent distributed in buildings and apartments.<br><br>Ardemagni at Fig. 1: |

| Asserted Claims | Ardemagni |
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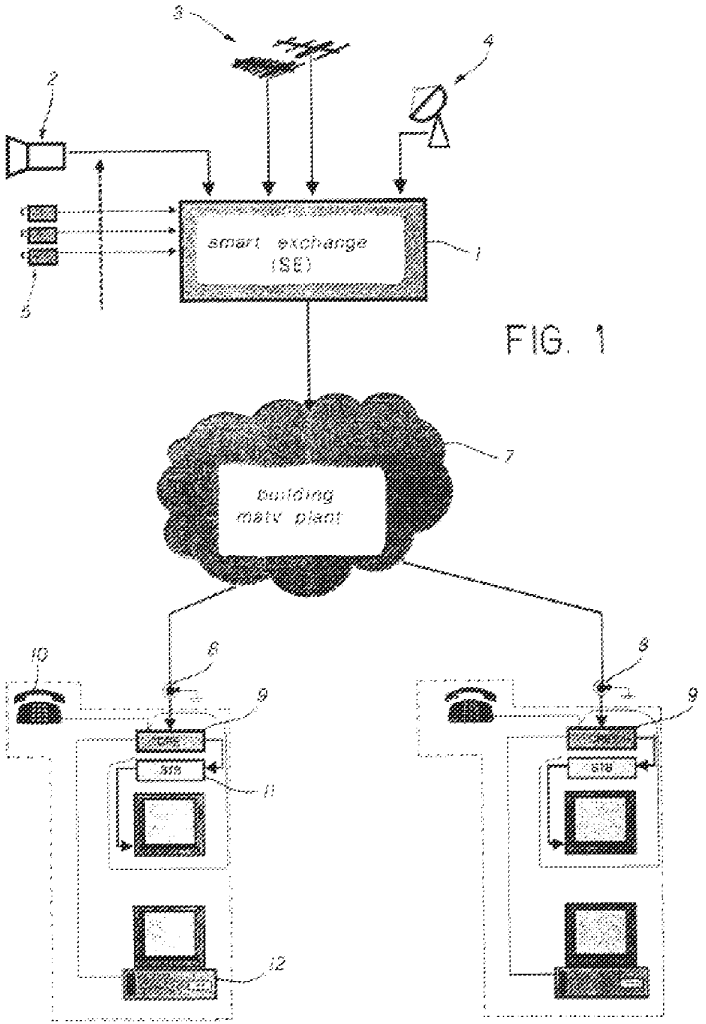
| |  FIG. 1 |

| Asserted Claims | Ardemagni |
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| | To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Ardemagni discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Ardemagni at Abstract:<br><br>The invention relates to an optimized system for distribution of television and telecommunication services from a peripheral node to user terminals (10, 11, 12) comprising a bi-directional switch exchange (1) connected to said peripheral node, a facility (7) for bi-directional distribution of signals connected to said exchange (1) and at least one user apparatus (9) connected to said user terminals (10, 11, 12), said exchange (1) receiving from said peripheral node the signals belonging to said television and telecommunication services and from said bi-directional distribution facility (7) a local upstream data sequence including the television channel selection signals, said exchange (1) selecting some input signals belonging to television services and reallocating and/or frequency transmodulating them in order to transmit them, in combination with a local downstream data sequence, to said signal bi-directional distribution facility (7), said user apparatus (9) processing said local downstream data sequence and generating said local upstream data sequence to be transmitted to said exchange (1) together with the upstream data and/or voice channels related to said telecommunication services. |

| Asserted Claims | Ardemagni |
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| | Ardemagni at 3:12–4:19:<br><br>Specific subject matter of this invention is an optimized system for distribution of television and telecommunication services from a peripheral node to user terminals, said television services including land based radio frequency broadcast television channels, satellite based radio frequency broadcast television channels and HFC network or cable based broadcast television channels, each of said telecommunication services including a downstream data and/or voice channel and an upstream data and/or voice channel, said system also including a bi- directional switch exchange connected to said peripheral node, a facility for bi-directional distribution of signals connected to said exchange and at least a user apparatus connected to said bi-directional facility as well as to said user terminals, said exchange comprising a filter, a frequency filtering and translating unit, a logic control unit, a combiner and a selector, said combiner and selector being connected to said bidirectional distribution facility, the signals belonging to said land based television channels being applied to the input of said combiner, said filter receiving the signals belonging to said cable based television channels and to said downstream data and/or voice channels, said filter separating the signals belonging to said downstream data and/or voice channels from the signals belonging to said cable based television channels, said filter also reallocating the signals belonging to said downstream data and/or voice channels to pre-established frequencies and applying them to the input of said combiner, said filter also applying the signals belonging to said cable based television channels to said frequency filtering and translating unit, the signals belonging to said satellite based television channels being also applied to said frequency filtering and translating unit, said selector being connected to said bi-directional distribution facility in order to receive a local upstream data sequence therefrom and to apply it to said control logic unit and to receive the signals belonging to said upstream data and/or voice channels therefrom and to apply them to said peripheral node, said control logic unit generating the control signals to be applied to said frequency filtering and translating unit and a local downstream data sequence to be applied to the input of said combiner, said frequency filtering and translating unit selecting the input signals and frequency reallocating and/or translating them for applying them to the input of said combiner, said combiner mixing the input signals and applying them to said bi-directional distribution facility, said user apparatus |

| Asserted Claims | Ardemagni |
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| | including a demodulator, a logic unit, a modulator and a combiner, said logic unit processing said local downstream data sequence outcoming from said demodulator, said modulator modulating a local upstream data sequence related to said user apparatus, said combiner mixing the signals belonging to said local upstream data sequence as well as the signals belonging to upstream data and /or voice channels related to said user apparatus and applying them to said bidirectional distribution facility.<br><br>Ardemagni at 4:28–35:<br><br>Further according to this invention, said frequency filtering and translating unit comprises a converter unit for conversion of HFC radio frequencies, a converter unit for conversion of satellite based radio frequencies as well as a switch unit, said converter units having N inputs and N outputs, said switch unit having 2*N inputs and N outputs, the homologous outputs of both said converter units being alternatively selected by said switch unit and transferred to said frequency filtering and translating unit.<br><br>Ardemagni at 7:16–31:<br><br>As it will be detailedly described hereinafter, the system according to this invention allows to utilize a MATV plant or facility for conveying in bi-directional way the signals of all television and telecommunication services to the input of said exchange, thereby supplying them to all active user terminals (10, 11, 12), by means of a selection operation, advanced up to the level of said exchange 1 , among the specific non land based television channels as requested by active STB terminals 11. In particular, when a user selects a specific satellite or cable based television channel on his STB terminal 11 , the selection signal returns to the exchange 1 in order to redefine its switching pattern and to supply the concerned STB terminal 11 with only the selected television channel, rather than all available channels. When it is considered that STB terminal 11 could also receive signals belonging to more than one television services, it evidently appears that a reduction is obtained in terms of occupation of the band of the transmission channel interposed between the building node and the individual socket 8. |

| Asserted Claims | Ardemagni |
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| | Ardemagni at 7:32–35:<br><br>In other words, even if at least three television services are present at each user socket 8 and each service offers a big number of channels, each active user STB terminal 11 will select a single television channel.<br><br>Ardemagni at 8:26–35:<br><br>In this respect, the signals conveyed by said facility 7 from the exchange 1 to the various user apparatuses 9, by which the so-called "downstream" flow or channel i? formed, comprise all signals belonging to land based television channels, coming from the receiver system 3 for the land based television radio frequencies, all signals belonging to downstream data and/or voice channels corresponding to telecommunication services, the signals belonging to satellite based and/or cable based television channels as selected by active user STB terminals 11 and lastly signals generated by exchange 1 for controlling said active STB terminals 11.<br><br>Ardemagni at 9:1–10:<br><br>On the other hand, the signals conveyed by said facility 7 from the user apparatuses 9 to exchange 1 , by which the so-called "upstream" flow or channel is formed, comprise the signals belonging to upstream data and/or voice channels corresponding to telecommunication services as well as all signals corresponding to the selections performed by active user STB terminals 11. Such selection signals included in said upstream channel are utilized by said exchange 1 to convey at each time only signals belonging to satellite based and/or cable based television channels corresponding to the selections performed by the active user STB terminals 11.<br><br>Ardemagni at 9:24–28: |

| Asserted Claims | Ardemagni |
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| | Therefore, exchange 1 is adapted to allocate signals belonging to satellite based and/or cable based television channels into frequency band 16 variable in the range of 110 to 170 MHz and into frequency band 17 variable in the range of 230 to 470 MHz, as selected by active STB terminals 11.<br><br>Ardemagni at 12:7–23:<br><br>By referring to Figure 4a, each radio frequency filter-converter HFC is provided with a constant amplitude pass band and tuneable central frequency tuner 33, which filters the input HFC television signals, as allocated to frequency band extending between 54 and 862 MHz, and allows the HFC television signal selected by a STB terminal 11 to pass to the output. The output television signal is then frequency translated by means of a mixer 34 that mixes it with the signal of a selectable frequency local oscillator 35, as well as a band-pass filter 36, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 37 generates the control signals to be used to establish the central frequency of tuner 33, the frequency of oscillator 35 and the central frequency of filter 36. Figure 4b illustrates a schematic diagram showing the frequency distribution of the signal modulated with 64QAM modulation (64 symbol Quadrature Amplitude Modulation) with a band width of 8 MHz, as appearing at the output of the converter-filter of Figure 4a when the frequency translation operation reallocates the selected television signal to band 17 (extended S band).<br><br>Ardemagni at 12:24–13:10:<br><br>By referring to Figure 5a, a first embodiment of the satellite radio frequency converter-filters includes a tuner 38, having a pass band of constant amplitude and tuneable central frequency, which filters the input satellite based television signals, as allocated to the frequency band extending from 950 and 2050 MHz, and allows the satellite based television signal selected by STB terminal 11 to pass to the output. In particular, the input satellite based television signals are modulated with Quaternary Phase Shift Keying (QPSK) modulation with a band width of |

| Asserted Claims | Ardemagni |
|---|---|
| | 40 MHz. The television signal outputted by tuner 38 is then frequency translated by means of mixer 39 that mixes it with the signal of a selectable frequency local oscillator 40, as well as a band-pass filter 41, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 42 generates the control signals to be used to establish the central frequency of tuner 38, the frequency of oscillator 40 and the central frequency of filter 41. In this case, channel QPSK appears to be reallocated, for instance to band 17, but it still occupies a band of 40 MHz. This means that the satellite radio frequency converter-filter of Figure 5a has a simple and low cost construction, but it still entails a band occupation 5 times larger than the band occupied by a 64QAM modulated signal, thereby reducing the number N of television channels allocable to facility 7. Furthermore, since the QPSK modulation is not compatible with STB terminals 11 for HFC television channels, an additional STB terminal 43 is anyway needed downstream of socket 8 in order to perform the transmodulation from QPSK to 64QAM system.<br><br>Ardemagni at 13:21–37:<br><br>As it is shown in Figure 3, each one of said N pairs of homologous outputs of the radio frequency conversion units 31 and 32, respectively, is coupled to one of N switches 46 that form a N output switching unit 47. In particular, each switch 46 corresponds to a STB terminal 11. Obviously, a HFC or satellite based television signal is present at the output of each switch 46, according to the selection of the corresponding STB terminal 11. Anyway, it is also possible to implement the arrangement so that, when the terminals connected at a given time are M, where M < N, the outputs of (N - M) switches 46 are in a high impedance condition. The N outputs (or the M active outputs) of said switching unit 47 are added in combiner 48 to the signals on the VHF output 19 and on the UHF output 20 of said filter unit 18 and to the signals belonging to the downstream data and/or voice channels of the telecommunication services available on output 23 of said filter 22. The output of combiner 48 forms the downstream channel that is conveyed from the exchange 1 through a duplexer 49 as well as the MATV facility 7 to the sockets 8 and to the user apparatuses 9. |

| Asserted Claims | Ardemagni |
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| | Ardemagni 14:1–10:<br><br>Upstream channel that is conveyed from said user apparatuses 9 to exchange 1 through said MATV facility 7 is transmitted by duplexer 49 to a selector 50 of local data. Said upstream channel is preferably allocated to frequency band extending from 5 to 30 MHz. Selector 50 separates all those signal corresponding to television channel selections performed by active STB terminals 11 , which form a local upstream data sequence, from signals belonging to upstream data and/or voice channel corresponding to telecommunication services. The signals belonging to upstream data and /or voice channels of telecommunication services are then passed unaltered and are transmitted to said HFC network 2.<br><br>Ardemagni at 15:18–37:<br><br>The data and/or voice upstream channels corresponding to telecommunication services outcoming from said telephone set 10, from said STB terminal 11 and from said PC 12 are modulated by a TELCO modulator 65 for telecommunication services. The signal travelling on an IR carrier outcoming from a remote controller 66 for selection of the television program and control of said STB terminal 11 is received by a receiver 67 and sent to a FSK modulator 68 that generates the local upstream data sequence related to the STB terminal 11 connected to the concerned user apparatus 9. The signals outcoming from said TELCO modulator 65 and from said FSK modulator 69 are added together in a combiner unit 69 and relayed to a further modulator 70. Modulator 70 in combination with a local oscillator 71 tuned on the frequency allotted to the specific concerned STB terminal 11 generates the upstream channel related to the considered user apparatus 9 and conveys it through a band pass filter 72 to the MATV facility 7 to enable it to reach the exchange 1. Preferably, the frequency on which said local oscillator 71 is tuned is comprised in the frequency band which extends from 5 to 30 MHz and coincides with the pass band of said filter 72. In particular, said local oscillator 71 can also transmit the signal for acknowledging the address of said STB terminal 11 to logic unit 60. |

| Asserted Claims | Ardemagni |
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| | Ardemagni at 16:1–5:<br><br>In this way, the selection performed by a user is routed to the exchange 1 rather than directly to said STB terminal 1 , through said upstream channel by means of a combination of it with the TELCO data on a local oscillator of a frequency in the band of 5 to 30 MHz allotted to any individual user.<br><br>Ardemagni 17:11–17:<br><br>Also the simple selection performed by the user of a desired (not land based) television channel in respect of any one of the various available services is "intercepted" and routed through the upstream flow to said exchange 1 where it is compared with other analogous selections and consequently managed. In this case, a local (building) data channel is involved which is possibly a portion of an upstream data flow of greater amplitude.<br><br>Ardemagni at Fig. 1: |

| Asserted Claims | Ardemagni |
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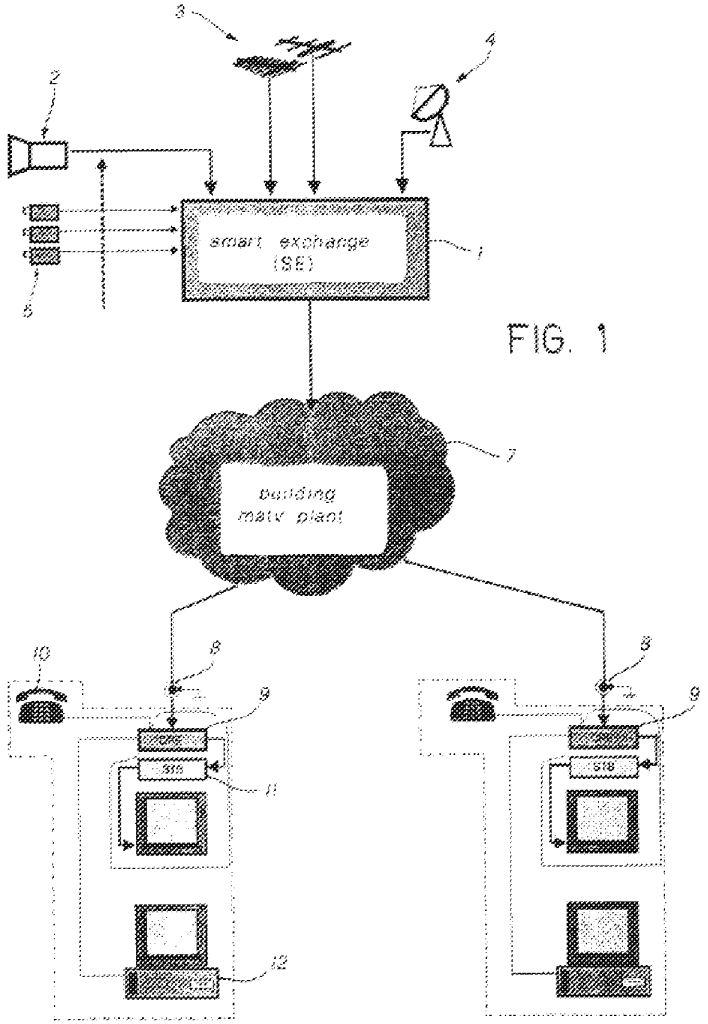
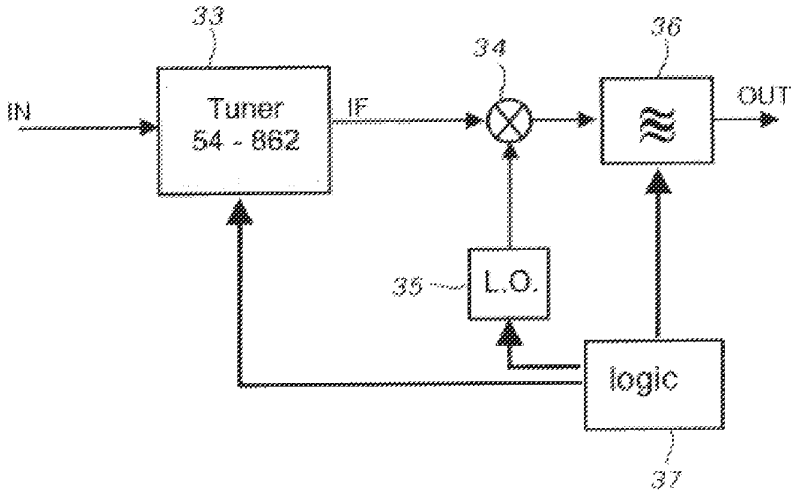
| |  <br>FIG. 1<br>Ardemagni at Fig. 4a: |

| Asserted Claims | Ardemagni |
|---|---|
| |  <br>FIG. 4a<br><br>To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Ardemagni discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*: |

| Asserted Claims | Ardemagni |
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| | Ardemagni at 5:22–25:<br><br>Still according to this invention, said satellite based radio frequency converter unit comprises N converter-filters, each of which comprises a transmodulator and a control logic unit, said transmodulator filtering , transmodulating and frequency translating the input signal.<br><br>Ardemagni at 12:7–23:<br><br>By referring to Figure 4a, each radio frequency filter-converter HFC is provided with a constant amplitude pass band and tuneable central frequency tuner 33, which filters the input HFC television signals, as allocated to frequency band extending between 54 and 862 MHz, and allows the HFC television signal selected by a STB terminal 11 to pass to the output. The output television signal is then frequency translated by means of a mixer 34 that mixes it with the signal of a selectable frequency local oscillator 35, as well as a band-pass filter 36, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 37 generates the control signals to be used to establish the central frequency of tuner 33, the frequency of oscillator 35 and the central frequency of filter 36. Figure 4b illustrates a schematic diagram showing the frequency distribution of the signal modulated with 64QAM modulation (64 symbol Quadrature Amplitude Modulation) with a band width of 8 MHz, as appearing at the output of the converter-filter of Figure 4a when the frequency translation operation reallocates the selected television signal to band 17 (extended S band).<br><br>Ardemagni at 12:24–13:10:<br><br>By referring to Figure 5a, a first embodiment of the satellite radio frequency converter-filters includes a tuner 38, having a pass band of constant amplitude and tuneable central frequency, which filters the input satellite based television signals, as allocated to the frequency band extending from 950 and 2050 MHz, and allows the satellite based |

| Asserted Claims | Ardemagni |
|---|---|
| | television signal selected by STB terminal 11 to pass to the output. In particular, the input satellite based television signals are modulated with Quaternary Phase Shift Keying (QPSK) modulation with a band width of<br>40 MHz. The television signal outputted by tuner 38 is then frequency translated by means of mixer 39 that mixes it with the signal of a selectable frequency local oscillator 40, as well as a band-pass filter 41, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 42 generates the control signals to be used to establish the central frequency of tuner 38, the frequency of oscillator 40 and the central frequency of filter 41. In this case, channel QPSK appears to be reallocated, for instance to band 17, but it still occupies a band of 40 MHz. This means that the satellite radio frequency converter-filter of Figure 5a has a simple and low cost construction, but it still entails a band occupation 5 times larger than the band occupied by a 64QAM modulated signal, thereby reducing the number N of television channels allocable to facility 7. Furthermore, since the QPSK modulation is not compatible with STB terminals 11 for HFC television channels, an additional STB terminal 43 is anyway needed downstream of socket 8 in order to perform the transmodulation from QPSK to 64QAM system.<br><br>Ardemagni 14:11–25:<br><br>The above mentioned local upstream data sequence, after demodulation by demodulator 5, is conveyed through an input/output (I/O) interface to a logic control unit 54 aimed at controlling said exchange 1 , which, by decoding them, provides for reading the address of the caller unit (identification of the STB terminal 11 formulating the request) as well as for construing the request. Based upon the requests, said logic unit 54 generates (if necessary) the control signals controlling said filtering and frequency translating unit 30 as well as the local downstream data sequence for controlling said STB terminal 11. Such local downstream data sequence, through said interface unit 53 and a modulator 55, preferably a binary frequency variation modulator (FSK = Frequency Shifting Keying), is coupled to the input of combiner 48 in order to be added to other signals by which the downstream channel of said exchange 1 is formed. Preferably, the carrier of said local downstream data sequence is at a frequency of 40 MHz. |

| Asserted Claims | Ardemagni |
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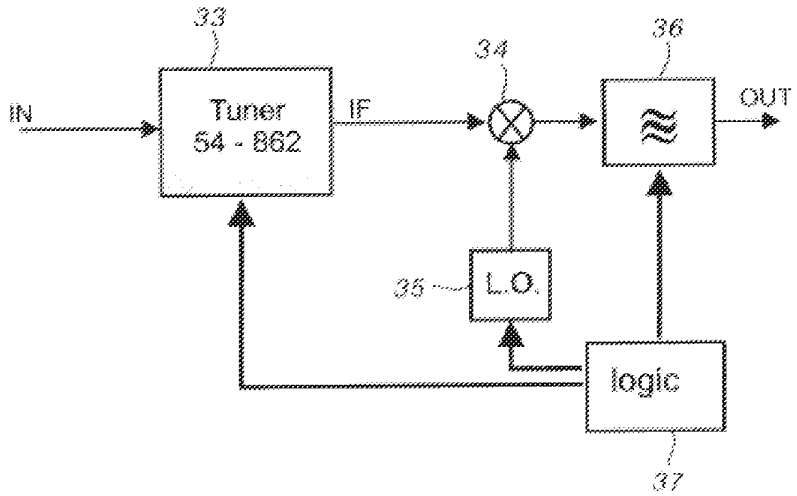
| | Ardemagni at Fig. 4a:<br>  <br><br>FIG. 4a<br>Ardemagni at Fig. 5a: |

| Asserted Claims | Ardemagni |
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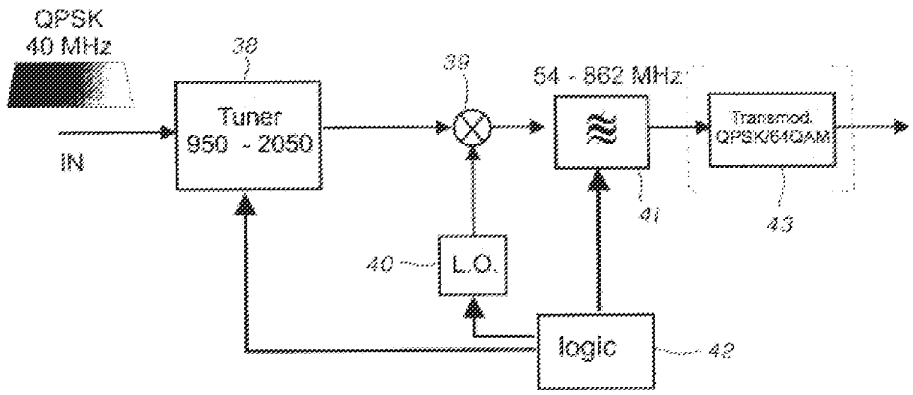
| | FIG. 5a<br>  <br><br>To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Ardemagni discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Ardemagni at Abstract: |

| Asserted Claims | Ardemagni |
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| | The invention relates to an optimized system for distribution of television and telecommunication services from a peripheral node to user terminals (10, 11, 12) comprising a bi-directional switch exchange (1) connected to said peripheral node, a facility (7) for bi-directional distribution of signals connected to said exchange (1) and at least one user apparatus (9) connected to said user terminals (10, 11, 12), said exchange (1) receiving from said peripheral node the signals belonging to said television and telecommunication services and from said bi-directional distribution facility (7) a local upstream data sequence including the television channel selection signals, said exchange (1) selecting some input signals belonging to television services and reallocating and/or frequency transmodulating them in order to transmit them, in combination with a local downstream data sequence, to said signal bi-directional distribution facility (7), said user apparatus (9) processing said local downstream data sequence and generating said local upstream data sequence to be transmitted to said exchange (1) together with the upstream data and/or voice channels related to said telecommunication services.<br><br>Ardemagni at 3:12–4:19:<br><br>Specific subject matter of this invention is an optimized system for distribution of television and telecommunication services from a peripheral node to user terminals, said television services including land based radio frequency broadcast television channels, satellite based radio frequency broadcast television channels and HFC network or cable based broadcast television channels, each of said telecommunication services including a downstream data and/or voice channel and an upstream data and/or voice channel, said system also including a bi- directional switch exchange connected to said peripheral node, a facility for bi-directional distribution of signals connected to said exchange and at least a user apparatus connected to said bi-directional facility as well as to said user terminals, said exchange comprising a filter, a frequency filtering and translating unit, a logic control unit, a combiner and a selector, said combiner and selector being connected to said bidirectional distribution facility, the signals belonging to said land based television channels being applied to the input of said combiner, said filter receiving the signals belonging to said cable based television channels and to said downstream data and/or voice channels, said filter separating the signals belonging to said downstream data and/or voice |

| Asserted Claims | Ardemagni |
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| | channels from the signals belonging to said cable based television channels, said filter also reallocating the signals belonging to said downstream data and/or voice channels to pre-established frequencies and applying them to the input of said combiner, said filter also applying the signals belonging to said cable based television channels to said frequency filtering and translating unit, the signals belonging to said satellite based television channels being also applied to said frequency filtering and translating unit, said selector being connected to said bi-directional distribution facility in order to receive a local upstream data sequence therefrom and to apply it to said control logic unit and to receive the signals belonging to said upstream data and/or voice channels therefrom and to apply them to said peripheral node, said control logic unit generating the control signals to be applied to said frequency filtering and translating unit and a local downstream data sequence to be applied to the input of said combiner, said frequency filtering and translating unit selecting the input signals and frequency reallocating and/or translating them for applying them to the input of said combiner, said combiner mixing the input signals and applying them to said bi-directional distribution facility, said user apparatus including a demodulator, a logic unit, a modulator and a combiner, said logic unit processing said local downstream data sequence outcoming from said demodulator, said modulator modulating a local upstream data sequence related to said user apparatus, said combiner mixing the signals belonging to said local upstream data sequence as well as the signals belonging to upstream data and /or voice channels related to said user apparatus and applying them to said bidirectional distribution facility.<br><br>Ardemagni at 4:20–23:<br><br>According to this invention, said exchange further comprises, upstream of said combiner, a unit for filtering the signals belonging to said land based television channels, which eliminates all replicated signals having the worst signal-to-noise ratio (SNR).<br><br>Ardemagni at 4:24–27: |

| Asserted Claims | Ardemagni |
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| | Still according to this invention, said television services further comprise television channels related to closed circuit television systems (CCTV) that are coupled to the input of said combiner or to said frequency filtering and translating unit.<br><br>Ardemagni at 5:34–6:9:<br><br>Still according to this invention, the local upstream or local downstream data sequences are modulated by digital modulation, preferably FSK and/or a PSK and/or QAM modulation and said user apparatus further comprises a digital demodulator arranged upstream of said logic unit, a frequency multiplexer and a TELCO demodulator for telecommunication services, arranged upstream of said user terminals, a TELCO modulator for telecommunication services, arranged downstream of said user terminals, a digital modulator which receives the television channel selection data from at least one user terminal as well as a combiner arranged downstream of said TELCO modulator and of said digital modulator and upstream of said bi-directional distribution facility.<br><br>Ardemagni at 13:21–37:<br><br>As it is shown in Figure 3, each one of said N pairs of homologous outputs of the radio frequency conversion units 31 and 32, respectively, is coupled to one of N switches 46 that form a N output switching unit 47. In particular, each switch 46 corresponds to a STB terminal 11. Obviously, a HFC or satellite based television signal is present at the output of each switch 46, according to the selection of the corresponding STB terminal 11. Anyway, it is also possible to implement the arrangement so that, when the terminals connected at a given time are M, where M < N, the outputs of (N - M) switches 46 are in a high impedance condition. The N outputs (or the M active outputs) of said switching unit 47 are added in combiner 48 to the signals on the VHF output 19 and on the UHF output 20 of said filter unit 18 and to the signals belonging to the downstream data and/or voice channels of the telecommunication services available on output 23 of said filter 22. The output of combiner 48 forms the downstream channel that is conveyed from the exchange |

| Asserted Claims | Ardemagni |
|---|---|
| | 1 through a duplexer 49 as well as the MATV facility 7 to the sockets 8 and to the user apparatuses 9.<br><br>Ardemagni at 15:18–37:<br><br>The data and/or voice upstream channels corresponding to telecommunication services outcoming from said telephone set 10, from said STB terminal 11 and from said PC 12 are modulated by a TELCO modulator 65 for telecommunication services. The signal travelling on an IR carrier outcoming from a remote controller 66 for selection of the television program and control of said STB terminal 11 is received by a receiver 67 and sent to a FSK modulator 68 that generates the local upstream data sequence related to the STB terminal 11 connected to the concerned user apparatus 9. The signals outcoming from said TELCO modulator 65 and from said FSK modulator 69 are added together in a combiner unit 69 and relayed to a further modulator 70. Modulator 70 in combination with a local oscillator 71 tuned on the frequency allotted to the specific concerned STB terminal 11 generates the upstream channel related to the considered user apparatus 9 and conveys it through a band pass filter 72 to the MATV facility 7 to enable it to reach the exchange 1. Preferably, the frequency on which said local oscillator 71 is tuned is comprised in the frequency band which extends from 5 to 30 MHz and coincides with the pass band of said filter 72. In particular, said local oscillator 71 can also transmit the signal for acknowledging the address of said STB terminal 11 to logic unit 60.<br><br>Ardemagni at Fig. 3: |

| Asserted Claims | Ardemagni |
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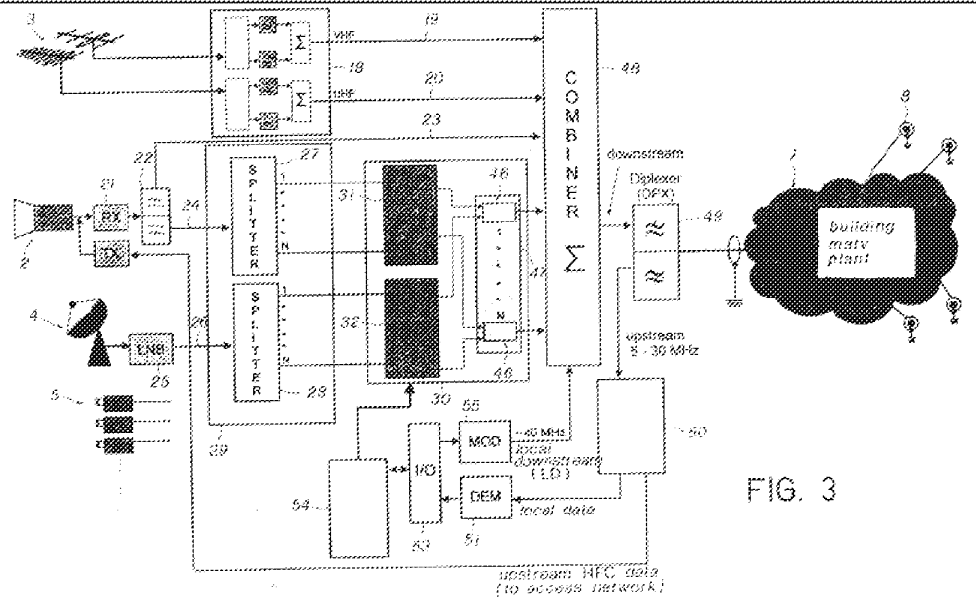
| |  <br>FIG. 3<br><br>To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the | Ardemagni discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*: |

| Asserted Claims | Ardemagni |
|---|---|
| programs over a digital local area network (LAN) to STBs. | Ardemagni at 1:7–12:<br><br>More particularly, this invention relates to a system of the above mentioned kind that enables the already existing facilities designed for centralized distribution of land based television channels, also known as Master Antenna TV (MATV) to also be adapted, in economically convenient and reliable way, to simultaneously distribute other television and telecommunication services, also including the interactive services.<br><br>Ardemagni at 3:5–11:<br><br>It is an object of this invention, therefore, to enable in simple, economically convenient and reliable way to utilize a single plant for distributing the concerned signals, preferably a conventional, possibly already installed MATV plant, between the peripheral node and the user terminals connected thereto, for contemporaneous distribution of land based television channels as well as other television and/or telecommunication services, also including any interactive services.<br><br>Ardemagni at 5:26–28:<br><br>Further according to this invention, said signal bi-directional distribution facility is an apparatus for centralized distribution of land based television channels or a Master Antenna TV (MATV) facility.<br><br>Ardemagni at 7:16–31:<br><br>As it will be detailedly described hereinafter, the system according to this invention allows to utilize a MATV plant or facility for conveying in bi-directional way the signals of all television and telecommunication services to the input of said exchange, thereby supplying them to all active user terminals (10, 11 , 12), by means of a selection operation, advanced up to the level of said exchange 1 , among the specific non land based television channels as requested by active STB terminals 11. In particular, when a user selects a specific satellite or cable based television channel on his STB terminal 11 , the selection signal |

| Asserted Claims | Ardemagni |
|---|---|
| | returns to the exchange 1 in order to redefine its switching pattern and to supply the concerned STB terminal 11 with only the selected television channel, rather than all available channels. When it is considered that STB terminal 11 could also receive signals belonging to more than one television services, it evidently appears that a reduction is obtained in terms of occupation of the band of the transmission channel interposed between the building node and the individual socket 8.<br><br>Ardemagni at 8:1–9:<br><br>In particular, aiming at making the system according to this invention compatible with the distribution of signals belonging to land based television channels to users not having connections with other television services and consequently are not provided with STB terminals 11 , according to the preferred embodiment of this invention, all these signals are conveyed by the MATV facility 7, thereby eliminating the signals replicated with the worst Signal-to-Noise Ratio (SNR) at the most, and maintaining the selection at a level corresponding to the user television set.<br><br>Ardemagni at 8:26–35:<br><br>In this respect, the signals conveyed by said facility 7 from the exchange 1 to the various user apparatuses 9, by which the so-called "downstream" flow or channel is formed, comprise all signals belonging to land based television channels, coming from the receiver system 3 for the land based television radio frequencies, all signals belonging to downstream data and/or voice channels corresponding to telecommunication services, the signals belonging to satellite based and/or cable based television channels as selected by active user STB terminals 11 and lastly signals generated by exchange 1 for controlling said active STB terminals 11.<br><br>Ardemagni at 16:12–21: |

| Asserted Claims | Ardemagni |
|---|---|
| | It will also be apparent to those skilled in the art that a system according to this invention can easily be modified and/or adapted to process signals belonging to further television and/or telecommunication services. By way of exemplification, as it is shown in Figures 4 and 5, CCTV systems 5 can be provided such that, by suitable insertion of signals related to video and/or audio and/or control functions into channels upstream or downstream of said exchange 1 , they can be transmitted unaltered along said MATV facility 7 or they can be transmitted only if activated by the user and reallocated in frequency by said exchange 1.<br><br>Ardemagni at 16:33–17:10:<br><br>Said already existing or newly realized MATV facility 7 appears to be completely transparent to the usual broadcast or diffusion of land based television channels. In view of the above, exchange 1 is compatible with the usual services offered by said MATV facility 7 and any user not desiring to be connected to further television or telecommunication services continues anyway to utilize the land based signals. On the opposite side, any user desiring to be connected to further services should provide his own coaxial socket 8 (any one in his flat) with the concerned user apparatus 9, which acts as a "concentrator" in respect of the various user terminals (10, 11 , 12) installed in the concerned apartment. The connection between user apparatus 9 and said user terminals (10, 11 , 12) is realized by means of standard interface units (telephone cable, coaxial cable or infrared coupling), but it is possible to realize a radio connection, as well.<br><br>Ardemagni at 17:18–23:<br><br>The above exchange 1 is coupled, on one side, to the various input services outcoming from the antennas and/or from external cables, namely the land based television channels, the HFC telecommunication services, the satellite based television channels and, on the other side, namely the output side, to coaxial cable of said MATV distribution facility 7. |

| Asserted Claims | Ardemagni |
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| | Ardemagni at 17:29–18:2:<br><br>Apparatus 9 performs the function to "dialogue" with said exchange 1 (in order to manage the MATV facility 7 in a suitable form to convey a plurality of interactive and not-interactive television services) and, at the same time, it is "open" to conveying telecommunication signals so that said MATV facility 7 can be effectively considered as a natural completion of radio based point-multipoint or PTM access systems presently studied, in order to easily apply such PTM systems in urban areas where the users are to a large extent distributed in buildings and apartments.<br><br>Ardemagni at Fig. 1: |

| Asserted Claims | Ardemagni |
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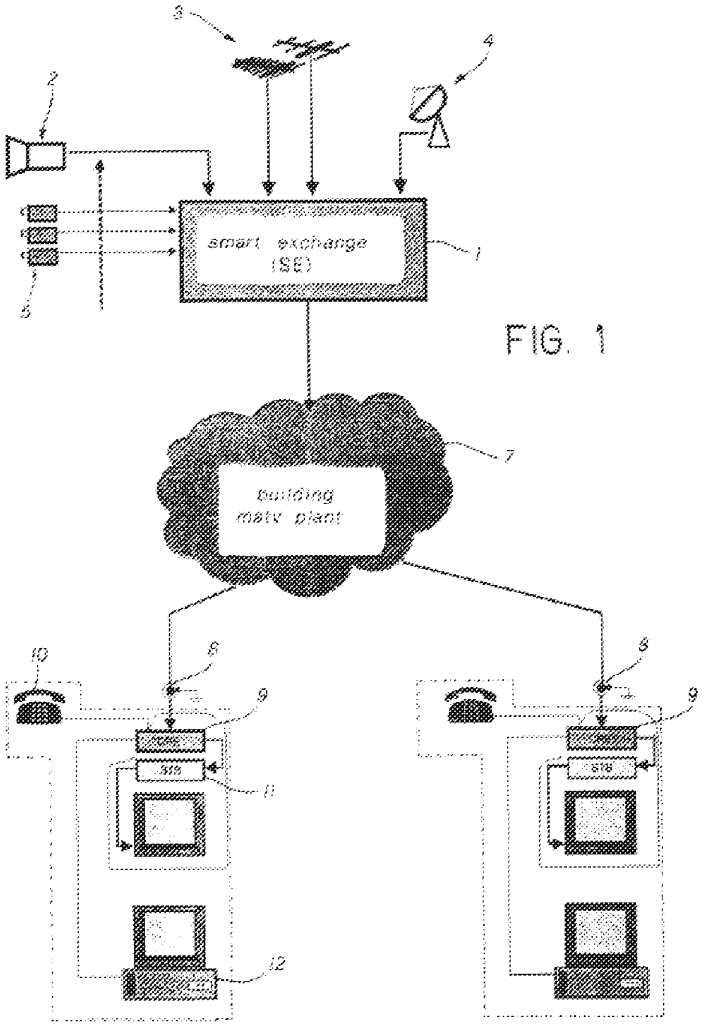
| |  FIG. 1 |

| Asserted Claims | Ardemagni |
|---|---|
| | To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Ardemagni discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Ardemagni discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Ardemagni |
|---|---|
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Ardemagni discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

# INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Carnero

European Patent Application EP 0 740 434 ("Carnero") was published on October 30, 1996. Carnero therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (b). For the reasons listed below, Carnero invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Carnero |
|---|---|
| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Carnero discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Carnero at Abstract: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

**Exhibit B2 – Carnero Invalidity Claim Chart**

| Asserted Claims | Carnero |
|---|---|
| | (57) The invention relates to a system, in particular, a community antenna system, for distributing television signals of different channels.<br><br>The system consists of a signal generator (A), a head device (B) with a signal processing unit (400) and a distribution network (C, 13).<br><br>According to the invention, the signal processing device (400) comprises at least one channel-specific converter (4). Each channel-specific converter (4) converts a pre-definable channel in the intermediate frequency band, into another channel in the intermediate frequency band. Several channel-specific converters (4) are connected in a daisy chain. Channels that are not to be distributed are overlapped by channels that are to be transmitted through amplification of their signal levels.<br><br>The processed signals originate from different polarities and/or different satellites and are transmitted to user outlets (15) via a single distribution cable (13).<br><br>Carnero at Fig. 3: |

| Asserted Claims | Carnero |
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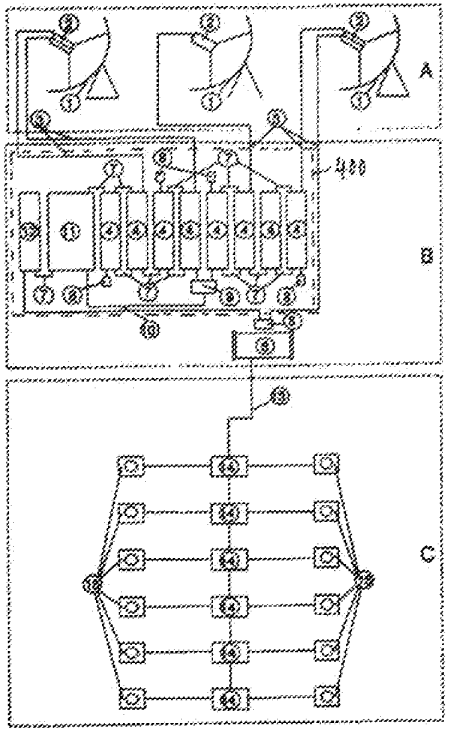
| |  <br>Carnero at 2:4-12:<br><br>The present invention relates to a system for distributing signals, in particular, a community antenna system for distributing television signals of different channels, according to the generic concept of Claim 1.<br><br>At present, two main systems are used for this purpose, which are shown schematically in Figures 1 and 2: |

| Asserted Claims | Carnero |
|---|---|
| | In the first state-of-the-art system, shown in Figure 1, signals received by the antenna are frequency-demodulated, individually for each channel, after amplification and conversion by units already known in the field (low-noise amplifier LNA, low-noise block converter LNB). Then, the channel-specific frequency-demodulated signals are amplitude-modulated in a conventional UHF television channel.<br><br>Carnero at 3:9-17:<br><br>The system, according to the invention, is characterized by a number of advantages. According to the invention, the user is provided with pre-definable channels, via only one distribution cable, which are individually selected from signals originating from one antenna or from several antennas. Individual selection of channels can be used to meet the demand of system users for the reception of predefined channels. The individual channel converters provided, according to the invention, which convert a pre-definable channel into another channel, as well as the system as a whole, are designed in a simple circuit. The channel-specific converters can be set to any frequency in a pre-definable frequency band. In this way, the system, according to the invention, makes it possible to flexibly meet a changed demand of the system users with regard to the reception of pre-definable channels.<br><br>Carnero at page 4:<br><br>The signal distribution system shown in the drawings, as well as in Figure 3, consists of three blocks A, B and C. Block A is a signal generator, block B is a head device with a signal processing unit and block C represents the distribution network.<br><br>Blocks A, B and C are designed as follows:<br><br>1. Block A is a signal generator consisting of at least one antenna 1 and known down converters 2 (low-noise amplifier LNA, low-noise block converter LNB). The received signals may originate from different broadcast and/or telecommunications satellites and/or have different polarities (horizontal, vertical). The down-converters 2 convert the received signals, in an already known way, from the received frequency range of, for example, 11.7 |

| Asserted Claims | Carnero |
|---|---|
| | - 12.5 GHz; 10.7 - 11.7 GHz; 12.5 - 12.75 GHz or preferably 10.7 - 12.5 GHz into an intermediate frequency range of, for example, 950 - 1760 MHz or preferably 950 MHz and 2,050 MHz.<br><br>2. Block B is a head device with a signal processing device 400, in which channel-specific converters 4 are arranged. The channel-specific converters 4 are described in more detail, in particular, with reference to Figure 7. Various designs of the signal processing device 400 are shown in Figures 3, 4, 5, and 6;<br><br>3. The distribution network C has a single distribution cable 13, through which the signals are transmitted to user outlets 15, via tapping or diverters 14.<br><br>Carnero at 10:1-21:<br><br>After the mixing process has been carried out in the second mixer 5, one or more channels shown in Figure 10 will be received, these channels then being distributed via the single distribution cable 13. In this case, as illustrated in Figure 10, channel 65 is superimposed on channel 60 (cf. larger amplitude of 65 compared to 60), channel 72 on channel 36, channel 68 on channel 44, channel 82 on channel 2, channel 77 on channel 6, channel 17 on channel 12, channel 89 on channel 18, and channel 41 on channel 24.<br><br>Thus, according to the invention, it is provided that signals, in particular, television signals transmitted via satellites, of different channels are distributed in a community antenna system. The signals are received in a signal generator A, and the received signals of a certain polarity (H, V) are converted from a receive frequency band into signals in an intermediate frequency band. The signals converted to the intermediate frequency band are processed and the processed signals are transmitted to user outlets 15, via a single distribution cable 13, in the intermediate frequency band. In this process, individual pre-definable channels in the intermediate frequency band are converted into other channels in the intermediate frequency band. |

| Asserted Claims | Carnero |
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| | First channels converted in the intermediate frequency band are mixed with second channels in the intermediate frequency band, and the first and second channels are transmitted over the distribution cable 13. In particular, different signal levels are generated for two channels of the same frequency, converted to the intermediate frequency band, with the signal levels of the signals of different channels differing by at least 15 dB.<br><br>Carnero at Claims 1-2:<br><br>1. A system for distributing signals, in particular, a community antenna system for distributing television signals of different channels transmitted, in particular, via satellites, said system comprising<br><br>- A signal generator (A) comprising at least one antenna (1) receiving the signals and at least one down-converter, (LNA/LNB 2) converting received signals of a certain polarity (H, V) from a receive frequency band, into signals in an intermediate frequency band,<br><br>- a head device (B), which is connected downstream of the signal generator (A), and which has at least one signal processing unit (400), which is connected on the input side via a cable (3) to the down converter (LNA/LNB 2), and which can be connected on the output side to a single distribution cable (13), via which the processed signals are transmitted in the intermediate frequency band to user outlets (15), characterized by the fact, that the signal processing unit (400) of the head device (B) has at least one channel-specific converter (4), and that the channel-specific converter (4) converts a pre-definable channel, in the intermediate frequency band, into another channel in the intermediate frequency band.<br><br>2. A system according to Claim 1, characterized in that channel-specific converters (4) of the head device (B) are integrated in at least one converter module (40), and that the converter module (40) can be connected at its input, via the cable (3), to the down converters (LNA/LNB 2), and at its output to the distribution cable (13). |

| Asserted Claims | Carnero |
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| | To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Carnero discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Carnero at page 4:<br><br>The signal distribution system shown in the drawings, as well as in Figure 3, consists of three blocks A, B and C. Block A is a signal generator, block B is a head device with a signal processing unit and block C represents the distribution network.<br><br>Blocks A, B and C are designed as follows:<br><br>1. Block A is a signal generator consisting of at least one antenna 1 and known down converters 2 (low-noise amplifier LNA, low-noise block converter LNB). The received signals may originate from different broadcast and/or telecommunications satellites and/or have different polarities (horizontal, vertical). The down-converters 2 convert the received signals, in an already known way, from the received frequency range of, for example, 11.7 - 12.5 GHz; 10.7 - 11.7 GHz; 12.5 - 12.75 GHz or preferably 10.7 - 12.5 GHz into an intermediate frequency range of, for example, 950 - 1760 MHz or preferably 950 MHz and 2,050 MHz.<br><br>2. Block B is a head device with a signal processing device 400, in which channel-specific converters 4 are arranged. The channel-specific converters 4 are described in more detail, in particular, with reference to Figure 7. Various designs of the signal processing device 400 are shown in Figures 3, 4, 5, and 6; |

| Asserted Claims | Carnero |
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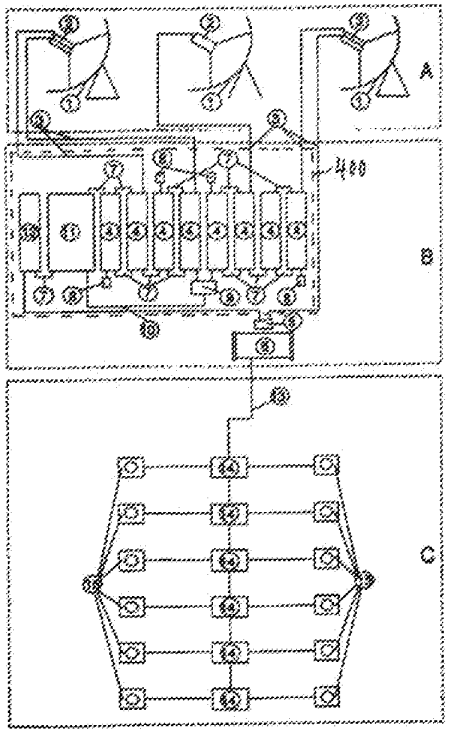
| | 3. The distribution network C has a single distribution cable 13, through which the signals are transmitted to user outlets 15, via tapping or diverters 14.<br><br>Carnero at Fig. 3:<br><br>  <br><br><br>To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior |

| Asserted Claims | Carnero |
|---|---|
| | art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Carnero discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Carnero at 3:9-17:<br><br>The system, according to the invention, is characterized by a number of advantages. According to the invention, the user is provided with pre-definable channels, via only one distribution cable, which are individually selected from signals originating from one antenna or from several antennas. Individual selection of channels can be used to meet the demand of system users for the reception of predefined channels. The individual channel converters provided, according to the invention, which convert a pre-definable channel into another channel, as well as the system as a whole, are designed in a simple circuit. The channel-specific converters can be set to any frequency in a pre-definable frequency band. In this way, the system, according to the invention, makes it possible to flexibly meet a changed demand of the system users with regard to the reception of pre-definable channels.<br><br>Carnero at 3:48-53:<br><br>The channel-specific converters may each have a microprocessor, that controls at least one oscillator. The microprocessor allows a converter-external input device to be detachably connected to the microprocessor and data to be input to the converter and the microprocessor, respectively, designating a predeterminable input channel frequency and a predeterminable output channel frequency. In this way, the channel-specific converters can be easily set to a pre-definable input frequency and a pre-definable output frequency, by |

| Asserted Claims | Carnero |
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| | which the frequency conversion of a channel is determined. The converter-external input device can also be designed as a remote-controlled transmitter.<br><br>Carnero at page 4:<br><br>The signal distribution system shown in the drawings, as well as in Figure 3, consists of three blocks A, B and C. Block A is a signal generator, block B is a head device with a signal processing unit and block C represents the distribution network.<br><br>Blocks A, B and C are designed as follows:<br><br>1. Block A is a signal generator consisting of at least one antenna 1 and known down converters 2 (low-noise amplifier LNA, low-noise block converter LNB). The received signals may originate from different broadcast and/or telecommunications satellites and/or have different polarities (horizontal, vertical). The down-converters 2 convert the received signals, in an already known way, from the received frequency range of, for example, 11.7 - 12.5 GHz; 10.7 - 11.7 GHz; 12.5 - 12.75 GHz or preferably 10.7 - 12.5 GHz into an intermediate frequency range of, for example, 950 - 1760 MHz or preferably 950 MHz and 2,050 MHz.<br><br>2. Block B is a head device with a signal processing device 400, in which channel-specific converters 4 are arranged. The channel-specific converters 4 are described in more detail, in particular, with reference to Figure 7. Various designs of the signal processing device 400 are shown in Figures 3, 4, 5, and 6;<br><br>3. The distribution network C has a single distribution cable 13, through which the signals are transmitted to user outlets 15, via tapping or diverters 14.<br><br>Block A of the system according to the invention, i.e., the signal generator, as shown for example in Figure 3, consists of antennas 1, which receive signals from television channels transmitted via satellites. If the antennas are parabolic antennas, a down converter 2 is arranged at the focal point of each antenna 1, which converts the received signals, in an |

| Asserted Claims | Carnero |
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| | already known manner, from the satellite television reception frequency range of, for example, 10.7 - 12.5 GHz into the intermediate frequency range between 950 MHz and 2,050 MHz (usually referred to as the "first intermediate frequency"). Such down converters 2 with an amplifier LNA and a channel block converter LNB, are known and available on the market.<br><br>Each antenna 1 has one or two downconverters 2 (or one downconverter with two outputs), depending on whether signals of one or two polarities (horizontal, vertical) are to be received per antenna. If the antenna 1 receives signals of one polarity, one down converter 2 is provided; if the antenna 1 receives signals of two polarities, two down converters 2 are provided.<br><br>The down converters 2 are each connected to a cable 3 on the output side. In various design versions of the invention, one or more cables 3, as shown in Figures 3, 4, 5, 6, and 9, run to the signal processing unit 400 having at least one channel-specific converter 4. It may also be intended, that one or more cables 3, as shown in Figures 3, 6 and 9, run to a ("second") mixer 5, which is connected downstream to a channel-specific converter 4, or to a converter module 40 having at least one channel-specific converter 4.<br><br>The channel-specific converters 4 of the head device B are preferably integrated in at least one converter module 40, wherein the converter module 40 can be connected at its input, via a cable 3, to a down converter (LNA/LNB) 2, and at its output to the distribution cable 13 (coaxial cable). Preferably, the distribution cable 13 is connected to the output of an amplifier 6, which may be connected downstream of the ("second") mixer 5.<br><br>Carnero at 5:1-47:<br><br>Each individual channel converter 4, the circuitry of which will be explained in detail in Figure 7, has two inputs and two outputs.<br><br>As shown in Figures 3, 4, 5, 6 and 9, the channel-specific converters 4 of a converter module 40 are interconnected, in such a way, that an input (e.g., EC1 in Figure 7) of a first |

| Asserted Claims | Carnero |
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| | converter module is connected to the input (e.g., EC2) of a second converter module (not shown in Figure 7), adjacent to the first converter module. Likewise, an output (such as SCI) of the first converter module is connected to the output (such as SC2) of the second converter module (daisy chain).<br><br>This daisy-chain structure has the practical advantage, that not every individual channel converter 4 has to be connected to a down converter 2 via a separate cable 3, and that, furthermore, not every individual channel converter 4 has to be connected via a separate cable to a ("second") mixer (5), which is connected upstream of the distribution cable 13.<br><br>It may be provided that each of the two inputs is respectively connected, e.g., via a respective known connecting bridge 7, to an input of an upstream channel-specific converter 4, or to the input of a downstream channel-specific converter 4. Likewise, with regard to the outputs, it can be provided that each of the two outputs is connected, for example, via a respective known connecting bridge 7, to an output of an upstream channel-specific converter 4 or to the output of a downstream channel-specific converter 4. Ideally, an identical housing is provided for each individual channel converter 4, i.e., a housing of the same spatial dimensions on which the input and output connections are arranged at the same locations. This allows the use of identical connecting bridges 7, each of which is used to establish an electrical connection either between two inputs or between two outputs.<br><br>Furthermore, it may be provided that one input of a converter 4 (first converter 4 of a converter module 40, which is drawn on the right side of a converter module in figures 4 and 5, respectively) is connected to a cable 3, which transmits the signals generated by the down converters 2, or converted to the intermediate frequency range. One input of a converter 4 (last converter 4 of a converter module 40, which is drawn on the left in Figures 4 and 5) is connected to a supply source 11, which supplies the converters 4 and an amplifier 12 provided per signal processing unit 400.<br><br>These channel-specific converters 4 receive on the input side the signals or channels in the intermediate frequency range, emitted by the down converters 2 and transmitted via the |

| Asserted Claims | Carnero |
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| | cables 3, and convert the signals or channels in the intermediate frequency range, as will still be described based on Figures 9 and 10.<br><br>Inputs of the channel-specific converters 4, which are not connected to the input of an adjacent converter or to which no cable 3 is connected, can be terminated with an ohmic resistor 8 of 75 ohms (cf. Figure 3, block B, reference number 8 above the converters 4; right converter module 40 in Figure 5; Figure 9, reference number 8 above the converters 4).<br><br>Likewise, outputs of the channel-specific converters 4 can be terminated with an ohmic resistor 8 of 75 ohms (cf. Figure 3, block B, reference number 8 below the converters 4; right and left converter module 40 in Figure 5; Figures 6 and 9, reference number 8 below the converters 4). These are, in particular, the output of a first converter 4 (with respect to the signal flow) in a first converter module (right converter module in Figure 5), as well as the output of a last converter 4 (with respect to the signal flow) in a last converter module (left converter module in Figure 5).<br><br>With each channel-specific converter 4, a channel is selected and converted from an input frequency, in the intermediate frequency range, to a predeterminable output frequency in the intermediate frequency range.<br><br>As described earlier, multiple channel-specific converters 4, at least two, preferably four converters 4 may be integrated into a converter module 40. Two adjacent modules can be combined via a ("first") mixer 9.<br><br>The output of the first mixer 9 is introduced into the feed source 11 and amplifier 12 arrangement by means of a connecting cable 10. The amplified signal is fed to the second mixer 5.<br><br>The channel-specific converter 4 is preferably designed as follows:<br><br>Carnero at 7:20-8:25: |

| Asserted Claims | Carnero |
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| | As shown in Figure 3, the distribution network C consists of a single distribution cable 13, on which all channels, that are FM modulated, are transmitted. The distribution cable 13 is made up of a coaxial cable and runs to diverters 14, which output the signal to various user outlets 15.<br><br>Figure 4 shows a signal processing unit 400 with one converter module 400 consisting of four channel-specific converters 4, while Figure 5 shows a signal processing unit 400 with two converter modules 400, each consisting of four channel-specific converters 4.<br><br>In the system, according to the invention, the number of channel-specific converters 4 is equal to the number of channels coupled into the distribution cable 13, and transmitted to the user outlets 15, via the diverters 14. The channel-specific converters can be set to predeterminable input frequencies in the intermediate frequency range, and to predeterminable output frequencies in the intermediate frequency range.<br><br>Figure 7 shows an example of a channel-specific converter 4. Two inputs EC1 and EC2 are electrically connected to each other and to an amplifier 42 via a directional coupler 41. The inputs EC1 and EC2 are mechanically designed, in such a way, that known connecting bridges (7 in Figure 4) can be used for connection to one input each of an adjacent channel-specific converter. In this way, several channel-specific converters can be integrated into one converter module.<br><br>This type of connection thus consists in each of the two inputs EC1, EC2 being connected, e.g., via a respective known connection bridge, to an input of an upstream channel-specific converter 4 or to the input of a downstream channel-specific converter 4. Similarly, each of the two outputs SC1, SC2 of the converter 4 is respectively connected, for example, via a respective known connecting bridge, to an output of an upstream channel-specific converter 4 or to the output of a downstream channel-specific converter 4. This type of connection has the advantage of not requiring distributors, which would otherwise have to be connected downstream of the down converters 2, and connecting cables between these distributors and channel-specific converters. |

| Asserted Claims | Carnero |
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| | The amplifier 42 amplifies the supplied signals, for example, in the frequency band from 950 to 2,050 MHz. The signals are fed to a tracking filter 43 on the input side. This filter is a bandpass filter tuned to the selected input channel frequency by means of a voltage, generated by a phase-locked loop (PLL) circuit 46. The circuit 46 is controlled by a microprocessor (MP) 49.<br><br>A mixer 44 connected downstream of the tracking filter 43 is actuated by a local oscillator (OL) 45, which in turn is actuated by the PLL circuit 46. The mixer 44 converts the frequency of the selected channel present at inputs EC1 and EC2 to a frequency of 479.5 MHz.<br><br>The signal formed by the mixer 44 is fed to a low-pass filter 47, whose cutoff frequency is 600 MHz, for example. This eliminates the signal from the local oscillator 45 and any unwanted signals formed during the mixing process.<br><br>The signal is then filtered by means of a SAW 50 surface acoustic wave filter, which has, for example, a bandwidth of 27 MHz at a center frequency of 479.5 MHz. The amplifiers 48 and 51, which are connected upstream and downstream of the SAW (surface acoustic wave) filter, respectively, increase the signal level, in such a way, that the losses caused by the SAW filter 50 are compensated.<br><br>The mixer 52 connected downstream of the amplifier 51 mixes the signal of the frequency 479.5 MHz, selected at the input, with a signal formed by a local oscillator (OL) 53. The local oscillator is controlled by a PLL circuit 54. The PLL circuit 54 is also controlled by the microprocessor 49. A tracking filter 55 is connected downstream of the mixer 52, which, like the filter 43, is a bandpass filter. The filter 55 eliminates the unwanted signals formed during the mixing done by the mixer 52. The output of filter 55 then carries the signal of the frequency-converted channel, which is fed to an amplifier 56. |

| Asserted Claims | Carnero |
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| | The gain of amplifier 56 is controllable, so that the levels of the frequency-converted channel signal can be set to pre-definable values (cf., for example, channels 1 and 5 in Figure 8)<br><br>A downstream directional coupler 57 feeds the amplified signal to the outputs SC1, SC2. The outputs SC1 and SC2 are mechanically designed, in such a way, that known connecting bridges (7 in Figure 4) can be used for connecting to one output each of an adjacent channel-specific converter.<br><br>As shown in Figure 7, the converters 4 may include a microprocessor 49, that controls the PLL circuits 46 and 54 and determines the input and output frequency of the channel signal of the converters 4. Further, the microprocessor 49 may control the amplifier 56. An input unit 16 can be connected to the microprocessor 49, for example, via a 4-cable bus, through which the data of a pre-definable input and output frequency and/or control data for the amplifier 56 (signal amplification parameters) can be input into the microprocessor 49.<br><br>The input unit 16 can have a control unit 162 (in particular, a microprocessor MP). A program assigned to the control unit 162 generates data as a function, for example, of the cutoff frequencies of the respective intermediate frequency range (950 MHz, 2,050 MHz), of channel bandwidths and channel spacings and signal levels of the channel signals, which corresponds to predefined technical specifications, and which is input into the microprocessor 49 of the channel-specific converter 4. The input unit 16 includes a keyboard 161, the control unit 162 and a display 163. The display shows data entered into the keypad 161, operator guidance information, and information indicating the state of the converter after it is configured by the data entered. The input unit 16 may be designed as a remote-controlled transmitter with a transmitting device, that transmits the data to be input to a receiver connected to the microprocessor 49 of the channel-specific converter.<br><br>Carnero at Figs. 3-7: |

# Exhibit B2 – Carnero Invalidity Claim Chart

| Asserted Claims | Carnero |
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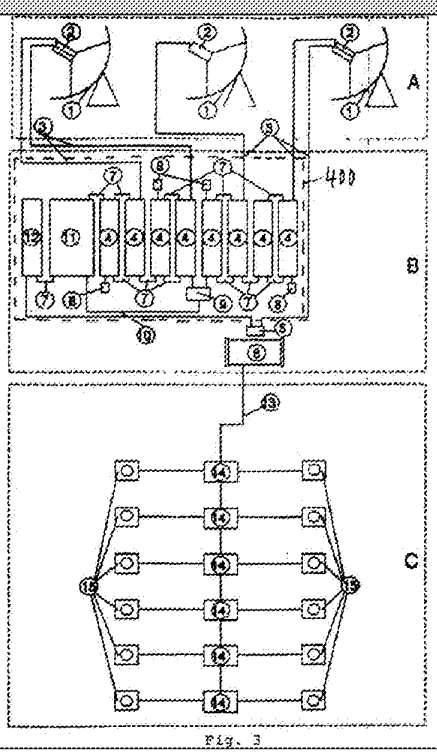
| |  <br>Fig. 3 |

| Asserted Claims | Carnero |
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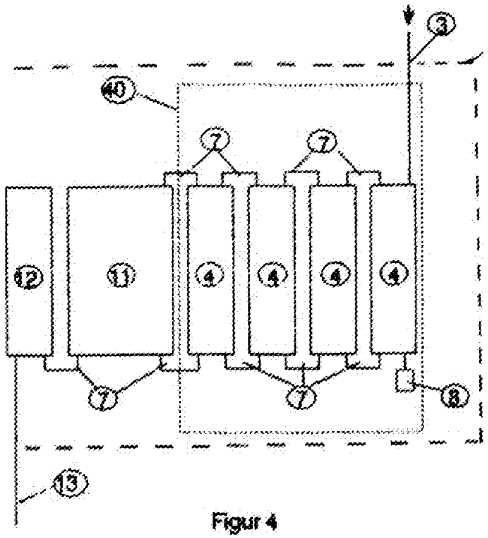
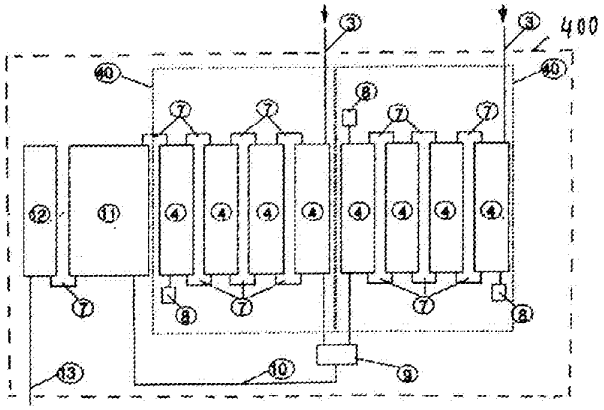
| |  <br>Figur 4<br>  <br>Figur 5 |

## Exhibit B2 – Carnero Invalidity Claim Chart

| Asserted Claims | Carnero |
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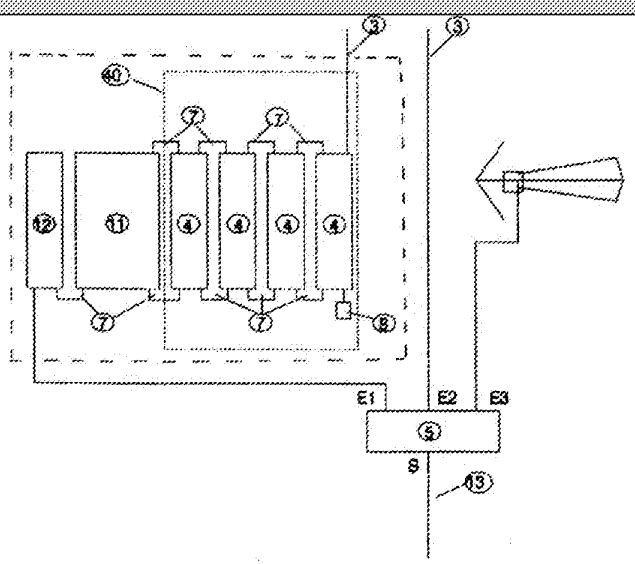
| |  <br>Figur 8 |

| Asserted Claims | Carnero |
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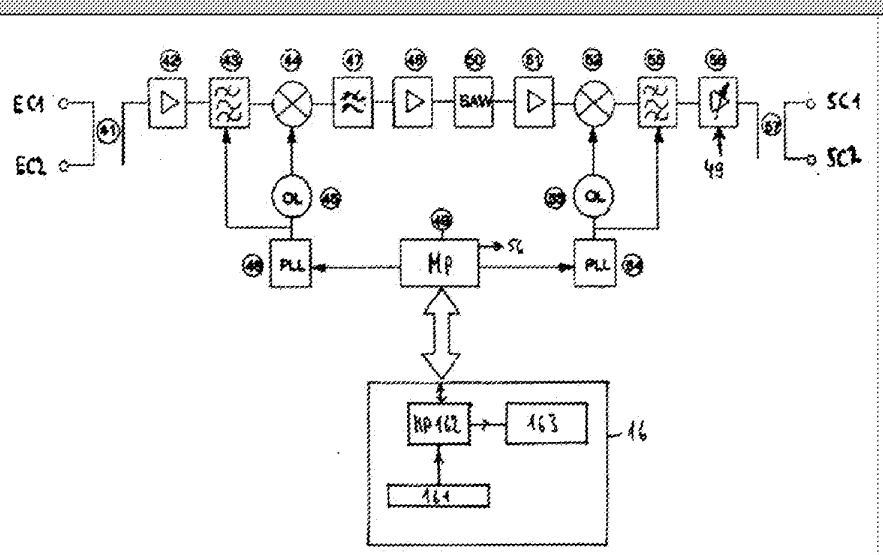
| |  <br>Fig. 7<br><br>Carnero at 9:36-10:6:<br><br>As shown in Figure 10, channels 70, 72, ...92, are located at circuit point g, channels 71, 73, ...93 are located at circuit point h, channels 65 - 69 are located at circuit point i, channels 49, 51...63, 33...47, 1, 3, ...31 are located at circuit point j, and channels 50, 52 ... 64; 34, 36, ... 48; 2, 4 ... 32 at circuit point k.<br><br>The desired channels are selected from all available channels at the switching points d - k. For example, channels 60, 36, 44, 2, 6, 12, 18, and 24 available at circuit point k are not processed further, while channels 65, 72, 68, 82, 77, 17, 89, and 41 available at circuit points g, h, i, j, are further processed instead. |

| Asserted Claims | Carnero |
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| | For this purpose, converter modules 40 are provided at the circuit points g, h, i, j, and the channel-specific converters 4 of the modules 40 are set to the input frequencies of each of the selected channels, and to the output frequencies, to which the channels are to be allocated. These output frequencies are occupied frequencies of unwanted channels to be overlaid or free frequencies.<br><br>According to the invention, channels are provided at the output of each converter module 40, which have a different frequency position compared to the frequency position at the input of the modules.<br><br>As can be seen from Figure 10, at circuit point i, channels 72, 82, 77, and 89 occur in a frequency position, that is different from the frequency position of the channels at circuit points g and h. Channels 65, 68, 17 and 41 exist at circuit point m, which originate from circuit points I and j, also in different frequency positions. After the channels have been subjected to a mixing process in mixer 9, all selected channels originating from circuit points g, h, i and j are present at circuit point n, as shown in Figure 10, in frequency positions that differ from the original frequency positions. These channels are introduced via the feed source 11 into the amplifier 12, which amplifies the signal levels of the channels. Then, the channels present at circuit point n are mixed with the channels present at circuit point k in mixer 5. In this mixing process, the channels present at circuit point n are overlaid on the channels of the same frequency, that are present at circuit point k.<br><br>The channels at circuit point n have a higher signal level of at least 15, but preferably 18 to 20 dB above the signal levels of the channels at circuit point k, which are to be overlaid. This level difference ensures that the channel, that overlays another channel, is received without interference from the channel that has been overlaid.<br><br>After the mixing process has been carried out in the second mixer 5, one or more channels shown in Figure 10 will be received, these channels then being distributed via the single distribution cable 13. In this case, as illustrated in Figure 10, channel 65 is superimposed on channel 60 (cf. larger amplitude of 65 compared to 60), channel 72 on channel 36, |

| Asserted Claims | Carnero |
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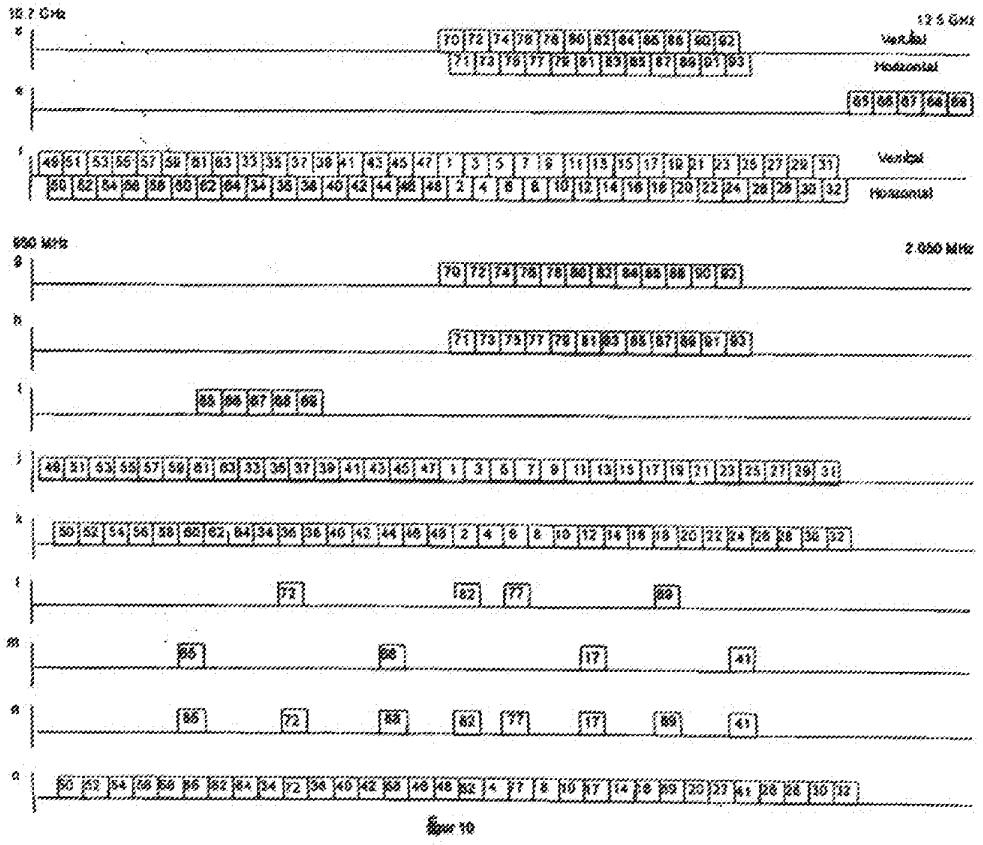
| | channel 68 on channel 44, channel 82 on channel 2, channel 77 on channel 6, channel 17 on channel 12, channel 89 on channel 18, and channel 41 on channel 24.<br><br>Carnero at Fig. 10:<br><br>  <br><br>Carnero at Claims 3-4: |

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| | 3. A system according to Claim 2, characterized in that the converter module (40) comprises at least two channel-specific converters (4), and that the channel-specific converters (4) in the converter module (40) are interconnected, in such a way, that an input (EC1) of a first converter module is connected to an input (EC2) of a second converter module, adjacent to the first converter module, and that an output (SC1) of the first converter module is connected to an output (SC2) of the second converter module.<br><br>4. A system according to Claim 3, characterized in that the connection, of the inputs of two adjacent channel-specific converters (4) and/or the connection of the outputs of two adjacent channel-specific converters (4), is realized by connecting bridges (7).<br><br>To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Carnero discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Carnero at 5:1-47:<br><br>Each individual channel converter 4, the circuitry of which will be explained in detail in Figure 7, has two inputs and two outputs.<br><br>As shown in Figures 3, 4, 5, 6 and 9, the channel-specific converters 4 of a converter module 40 are interconnected, in such a way, that an input (e.g., EC1 in Figure 7) of a first converter module is connected to the input (e.g., EC2) of a second converter module (not shown in Figure 7), adjacent to the first converter module. Likewise, an output (such as |

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| | SCI) of the first converter module is connected to the output (such as SC2) of the second converter module (daisy chain).<br><br>This daisy-chain structure has the practical advantage, that not every individual channel converter 4 has to be connected to a down converter 2 via a separate cable 3, and that, furthermore, not every individual channel converter 4 has to be connected via a separate cable to a ("second") mixer (5), which is connected upstream of the distribution cable 13.<br><br>It may be provided that each of the two inputs is respectively connected, e.g., via a respective known connecting bridge 7, to an input of an upstream channel-specific converter 4, or to the input of a downstream channel-specific converter 4. Likewise, with regard to the outputs, it can be provided that each of the two outputs is connected, for example, via a respective known connecting bridge 7, to an output of an upstream channel-specific converter 4 or to the output of a downstream channel-specific converter 4. Ideally, an identical housing is provided for each individual channel converter 4, i.e., a housing of the same spatial dimensions on which the input and output connections are arranged at the same locations. This allows the use of identical connecting bridges 7, each of which is used to establish an electrical connection either between two inputs or between two outputs. Furthermore, it may be provided that one input of a converter 4 (first converter 4 of a converter module 40, which is drawn on the right side of a converter module in figures 4 and 5, respectively) is connected to a cable 3, which transmits the signals generated by the down converters 2, or converted to the intermediate frequency range. One input of a converter 4 (last converter 4 of a converter module 40, which is drawn on the left in Figures 4 and 5) is connected to a supply source 11, which supplies the converters 4 and an amplifier 12 provided per signal processing unit 400.<br><br>These channel-specific converters 4 receive on the input side the signals or channels in the intermediate frequency range, emitted by the down converters 2 and transmitted via the cables 3, and convert the signals or channels in the intermediate frequency range, as will still be described based on Figures 9 and 10. |

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| | Inputs of the channel-specific converters 4, which are not connected to the input of an adjacent converter or to which no cable 3 is connected, can be terminated with an ohmic resistor 8 of 75 ohms (cf. Figure 3, block B, reference number 8 above the converters 4; right converter module 40 in Figure 5; Figure 9, reference number 8 above the converters 4).<br><br>Likewise, outputs of the channel-specific converters 4 can be terminated with an ohmic resistor 8 of 75 ohms (cf. Figure 3, block B, reference number 8 below the converters 4; right and left converter module 40 in Figure 5; Figures 6 and 9, reference number 8 below the converters 4). These are, in particular, the output of a first converter 4 (with respect to the signal flow) in a first converter module (right converter module in Figure 5), as well as the output of a last converter 4 (with respect to the signal flow) in a last converter module (left converter module in Figure 5).<br><br>With each channel-specific converter 4, a channel is selected and converted from an input frequency, in the intermediate frequency range, to a predeterminable output frequency in the intermediate frequency range.<br><br>As described earlier, multiple channel-specific converters 4, at least two, preferably four converters 4 may be integrated into a converter module 40. Two adjacent modules can be combined via a ("first") mixer 9.<br><br>The output of the first mixer 9 is introduced into the feed source 11 and amplifier 12 arrangement by means of a connecting cable 10. The amplified signal is fed to the second mixer 5.<br><br>The channel-specific converter 4 is preferably designed as follows:<br><br>Carnero at 7:20-8:25:<br><br>As shown in Figure 3, the distribution network C consists of a single distribution cable 13, on which all channels, that are FM modulated, are transmitted. The distribution cable 13 is |

| Asserted Claims | Carnero |
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| | made up of a coaxial cable and runs to diverters 14, which output the signal to various user outlets 15.<br><br>Figure 4 shows a signal processing unit 400 with one converter module 400 consisting of four channel-specific converters 4, while Figure 5 shows a signal processing unit 400 with two converter modules 400, each consisting of four channel-specific converters 4.<br><br>In the system, according to the invention, the number of channel-specific converters 4 is equal to the number of channels coupled into the distribution cable 13, and transmitted to the user outlets 15, via the diverters 14. The channel-specific converters can be set to predeterminable input frequencies in the intermediate frequency range, and to predeterminable output frequencies in the intermediate frequency range.<br><br>Figure 7 shows an example of a channel-specific converter 4. Two inputs EC1 and EC2 are electrically connected to each other and to an amplifier 42 via a directional coupler 41. The inputs EC1 and EC2 are mechanically designed, in such a way, that known connecting bridges (7 in Figure 4) can be used for connection to one input each of an adjacent channel-specific converter. In this way, several channel-specific converters can be integrated into one converter module.<br><br>This type of connection thus consists in each of the two inputs EC1, EC2 being connected, e.g., via a respective known connection bridge, to an input of an upstream channel-specific converter 4 or to the input of a downstream channel-specific converter 4. Similarly, each of the two outputs SCI, SC2 of the converter 4 is respectively connected, for example, via a respective known connecting bridge, to an output of an upstream channel-specific converter 4 or to the output of a downstream channel-specific converter 4. This type of connection has the advantage of not requiring distributors, which would otherwise have to be connected downstream of the down converters 2, and connecting cables between these distributors and channel-specific converters.<br><br>The amplifier 42 amplifies the supplied signals, for example, in the frequency band from 950 to 2,050 MHz. The signals are fed to a tracking filter 43 on the input side. This filter is |

| Asserted Claims | Carnero |
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| | a bandpass filter tuned to the selected input channel frequency by means of a voltage, generated by a phase-locked loop (PLL) circuit 46. The circuit 46 is controlled by a microprocessor (MP) 49.<br><br>A mixer 44 connected downstream of the tracking filter 43 is actuated by a local oscillator (OL) 45, which in turn is actuated by the PLL circuit 46. The mixer 44 converts the frequency of the selected channel present at inputs EC1 and EC2 to a frequency of 479.5 MHz.<br><br>The signal formed by the mixer 44 is fed to a low-pass filter 47, whose cutoff frequency is 600 MHz, for example. This eliminates the signal from the local oscillator 45 and any unwanted signals formed during the mixing process.<br><br>The signal is then filtered by means of a SAW 50 surface acoustic wave filter, which has, for example, a bandwidth of 27 MHz at a center frequency of 479.5 MHz. The amplifiers 48 and 51, which are connected upstream and downstream of the SAW (surface acoustic wave) filter, respectively, increase the signal level, in such a way, that the losses caused by the SAW filter 50 are compensated.<br><br>The mixer 52 connected downstream of the amplifier 51 mixes the signal of the frequency 479.5 MHz, selected at the input, with a signal formed by a local oscillator (OL) 53. The local oscillator is controlled by a PLL circuit 54. The PLL circuit 54 is also controlled by the microprocessor 49. A tracking filter 55 is connected downstream of the mixer 52, which, like the filter 43, is a bandpass filter. The filter 55 eliminates the unwanted signals formed during the mixing done by the mixer 52. The output of filter 55 then carries the signal of the frequency-converted channel, which is fed to an amplifier 56.<br><br>The gain of amplifier 56 is controllable, so that the levels of the frequency-converted channel signal can be set to pre-definable values (cf., for example, channels 1 and 5 in Figure 8) |

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| | A downstream directional coupler 57 feeds the amplified signal to the outputs SC1, SC2. The outputs SC1 and SC2 are mechanically designed, in such a way, that known connecting bridges (7 in Figure 4) can be used for connecting to one output each of an adjacent channel-specific converter.<br><br>As shown in Figure 7, the converters 4 may include a microprocessor 49, that controls the PLL circuits 46 and 54 and determines the input and output frequency of the channel signal of the converters 4. Further, the microprocessor 49 may control the amplifier 56. An input unit 16 can be connected to the microprocessor 49, for example, via a 4-cable bus, through which the data of a pre-definable input and output frequency and/or control data for the amplifier 56 (signal amplification parameters) can be input into the microprocessor 49.<br><br>The input unit 16 can have a control unit 162 (in particular, a microprocessor MP). A program assigned to the control unit 162 generates data as a function, for example, of the cutoff frequencies of the respective intermediate frequency range (950 MHz, 2,050 MHz), of channel bandwidths and channel spacings and signal levels of the channel signals, which corresponds to predefined technical specifications, and which is input into the microprocessor 49 of the channel-specific converter 4. The input unit 16 includes a keyboard 161, the control unit 162 and a display 163. The display shows data entered into the keypad 161, operator guidance information, and information indicating the state of the converter after it is configured by the data entered. The input unit 16 may be designed as a remote-controlled transmitter with a transmitting device, that transmits the data to be input to a receiver connected to the microprocessor 49 of the channel-specific converter.<br><br>Carnero at 9:36-10:6:<br><br>As shown in Figure 10, channels 70, 72, ...92, are located at circuit point g, channels 71, 73, ...93 are located at circuit point h, channels 65 - 69 are located at circuit point i, channels 49, 51...63, 33...47, 1, 3, ...31 are located at circuit point j, and channels 50, 52 ... 64; 34, 36, ... 48; 2, 4 ... 32 at circuit point k. |

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| | The desired channels are selected from all available channels at the switching points d - k. For example, channels 60, 36, 44, 2, 6, 12, 18, and 24 available at circuit point k are not processed further, while channels 65, 72, 68, 82, 77, 17, 89, and 41 available at circuit points g, h, i, j, are further processed instead.<br><br>For this purpose, converter modules 40 are provided at the circuit points g, h, i, j, and the channel-specific converters 4 of the modules 40 are set to the input frequencies of each of the selected channels, and to the output frequencies, to which the channels are to be allocated. These output frequencies are occupied frequencies of unwanted channels to be overlaid or free frequencies.<br><br>According to the invention, channels are provided at the output of each converter module 40, which have a different frequency position compared to the frequency position at the input of the modules.<br><br>As can be seen from Figure 10, at circuit point i, channels 72, 82, 77, and 89 occur in a frequency position, that is different from the frequency position of the channels at circuit points g and h. Channels 65, 68, 17 and 41 exist at circuit point m, which originate from circuit points I and j, also in different frequency positions. After the channels have been subjected to a mixing process in mixer 9, all selected channels originating from circuit points g, h, i and j are present at circuit point n, as shown in Figure 10, in frequency positions that differ from the original frequency positions. These channels are introduced via the feed source 11 into the amplifier 12, which amplifies the signal levels of the channels. Then, the channels present at circuit point n are mixed with the channels present at circuit point k in mixer 5. In this mixing process, the channels present at circuit point n are overlaid on the channels of the same frequency, that are present at circuit point k.<br><br>The channels at circuit point n have a higher signal level of at least 15, but preferably 18 to 20 dB above the signal levels of the channels at circuit point k, which are to be overlaid. This level difference ensures that the channel, that overlays another channel, is received without interference from the channel that has been overlaid. |

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| | After the mixing process has been carried out in the second mixer 5, one or more channels shown in Figure 10 will be received, these channels then being distributed via the single distribution cable 13. In this case, as illustrated in Figure 10, channel 65 is superimposed on channel 60 (cf. larger amplitude of 65 compared to 60), channel 72 on channel 36, channel 68 on channel 44, channel 82 on channel 2, channel 77 on channel 6, channel 17 on channel 12, channel 89 on channel 18, and channel 41 on channel 24.<br><br>Carnero at Fig. 10: |

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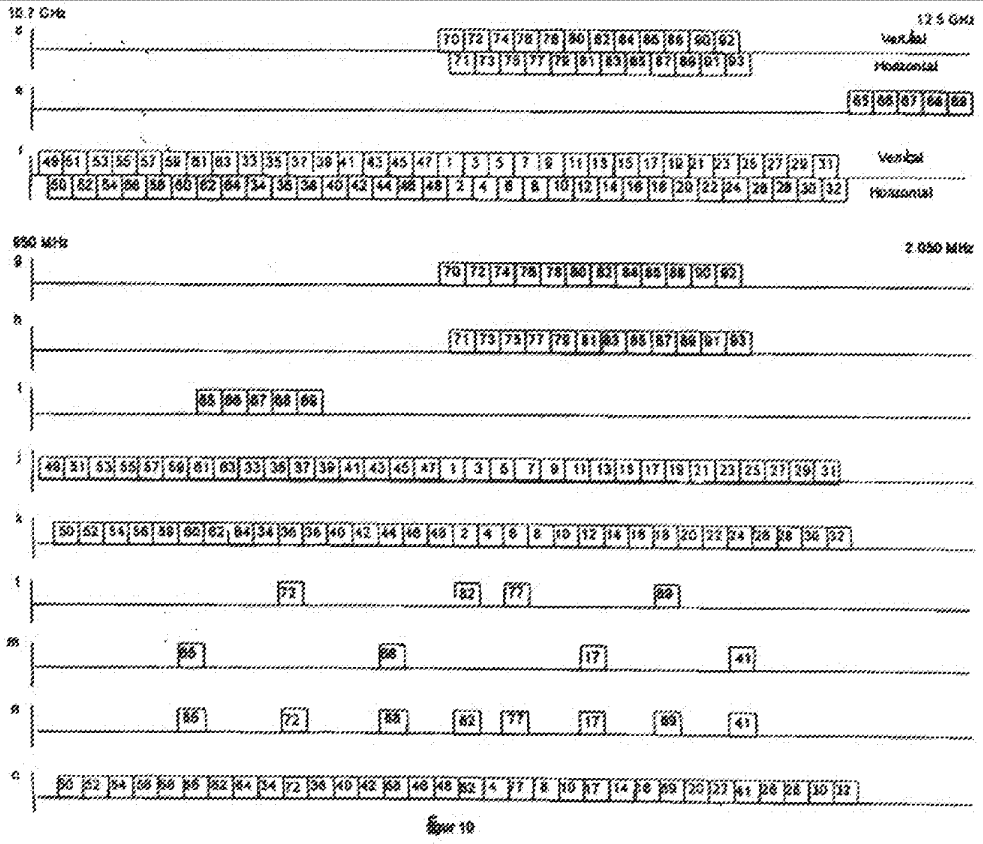
| |  <br>To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

<table>
<tr><th>Asserted Claims</th><th>Carnero</th></tr>
<tr><td>9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal;</td><td>Carnero discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>See, e.g.:<br><br>Carnero at 6:19-30:<br><br>Input side<br><table><tr><td>Frequency range:</td><td>950... 1,950 (or 2,050) MHz</td></tr><tr><td>Input level:</td><td>- 50 ... -30 dBm</td></tr><tr><td>Image frequency rejection:</td><td>≥ 40 dB</td></tr><tr><td>Intermediate frequency:</td><td>479.5 MHz</td></tr><tr><td>Bandwidth:</td><td>27 MHz</td></tr><tr><td>Loop-through input losses:</td><td>< 1.2 dB</td></tr></table><br>Output side<br><table><tr><td>Frequency range:</td><td>950 ... 1,950 (or 2,050) MHz</td></tr><tr><td>Max. output level:</td><td>- 25 ±5 dBm</td></tr><tr><td>Output level control range:</td><td>15 dB</td></tr><tr><td>Bandwidth:</td><td>27 MHz</td></tr><tr><td>Loop-through output losses:</td><td><1.2 dB</td></tr><tr><td>Interference level:</td><td>> - 20 dBc</td></tr></table><br>Carnero at 7:15-22:<br><br>As shown in Figure 6, first signals formed by a converter module 40 (input E1), as well as second signals formed by down converters 2 (input E2), as well as third signals emitted by antennas receiving signals from terrestrial transmitters, can be fed to the second mixer 5. The distribution cable 13 is connected to this mixer 5 on the output side. Alternatively, an</td></tr>
</table>

| Asserted Claims | Carnero |
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| | amplifier 6 is provided downstream of the mixer 5, to which the distribution cable 13 is connected on the output side.<br><br>As shown in Figure 3, the distribution network C consists of a single distribution cable 13, on which all channels, that are FM modulated, are transmitted. The distribution cable 13 is made up of a coaxial cable and runs to diverters 14, which output the signal to various user outlets 15.<br><br>Carnero at 8:26-9:20:<br><br>Figure 8 shows a second mixer 5, which is also shown in Figure 3, block B. For example, the second mixer 5 has three inputs E1, E2, E3 and an output S to which the distribution cable 13 is connected. The distribution cable 13 is preferably a coaxial cable, but an optical fiber may also be provided.<br><br>Input E1 is directly connected by a cable to one or more converter modules 40. Input E2 is directly connected by a cable 3 to a down-converter (2 in Figure 3), while input E3 is connected to a system for receiving terrestrial channels.<br>As shown in Figure 8 as an example, signals from channels 1, 2, 3, 4, 5 and 6 are fed to input E1. These signals originate from a satellite, have a bandwidth of 27 MHz and, as described, have been converted by channel-specific converters into the frequency band between 950 and 2,050 MHz.<br><br>Input E2 is fed with signals from channels 7, 8, 9, 10, 11, 12, 13 and 14, which originate from a satellite, have a bandwidth of 27 MHz, and have been converted by channel-specific converters in the frequency band between 950 and 2,050 MHz, as described.<br>Input E3 provides 6 terrestrial TV channels with 8 MHz bandwidth, in the frequency band between 47 and 860 MHz.<br><br>The signals of the channels coming in at input E1 are supplied by the channel-specific converters 4, in which the frequency conversion and the generation of the respective levels |

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| | are carried out, with regard to the coupling of the signals via the mixer output S into the distribution cable 13.<br><br>Channels 2, 4 and 6, which arrive at input E1, have been frequency-converted in the channel-specific converters 4, in such a way, that no channels of the same frequencies arrive at input E2. Channels 1 and 3 at input E1 are allocated in frequencies between the undesired channels 7 and 8 or 9 and 10, which come in at input E2. The signal or power level of channel 1 is set to a value at least 15 dB above the corresponding level of channels 7 and 8. The signal or power level of channel 3 is set to a value at least 15 dB above the corresponding level of channels 9 and 10.<br><br>Channel 5 of input E1 is set to the same frequency as the non-desired channel 12 at input E2, with the signal or power level of channel 5 being at least 20 dB above the corresponding level of channel 12.<br><br>The level difference (at least 15 dB or at least 20 dB) depends on the frequencies of the overlaying channel and the frequency of the channel(s) to be overlaid: at a different frequency (cf. channel 1 overlaying channels 7 and 8) the level difference is at least 15 dB; at the same frequency (cf. channel 5 overlaying channel 12) the level difference is at least 20 dB.<br><br>The channels at the inputs E1, E2 and E3 of mixer 5, which are configured in this way, with respect to frequency and level, are coupled by the mixer at output S into the distribution cable 13, in the arrangement shown in Figure 8:<br>- in the frequency band between 47 and 860 MHz, the same channels are available at output S, in the same frequency position, and with the same levels as at input E3;<br>- in the frequency band between 950 and 2,050 MHz, channels 7 and 8 of input E2 are overlaid at output S, by channel 1 of input E1. Since channel 1 is set to a signal level, that is at least 15 dB above the levels of channels 7 and 8, only channel 1 is visible to the system user, without channels 7 and 8 causing interference. |

| Asserted Claims | Carnero |
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| | Likewise, at output S, channels 9 and 10 of input E2 are overlaid by channel 3 of input E1. In addition, channel 5 of input E1 is coupled into distribution cable 13 at output S, in the frequency position of channel 12 of input E2, with channel 5 overlapping channel 12, because the signal level of channel 5 is at least 20 dB above channel 12.<br><br>In addition, channel 4 (originally at input E1) is coupled into distribution cable 13 between channels 3 (originally at input E1) and 11 (originally at input E2), and channel 6 (originally at input E1) is coupled between channels 13 (originally at input E2) and 14 (originally at input E2). Channels 4 and 6 are thus inserted into free frequency positions at input E2<br><br>Carnero at Fig. 8: |

| Asserted Claims | Carnero |
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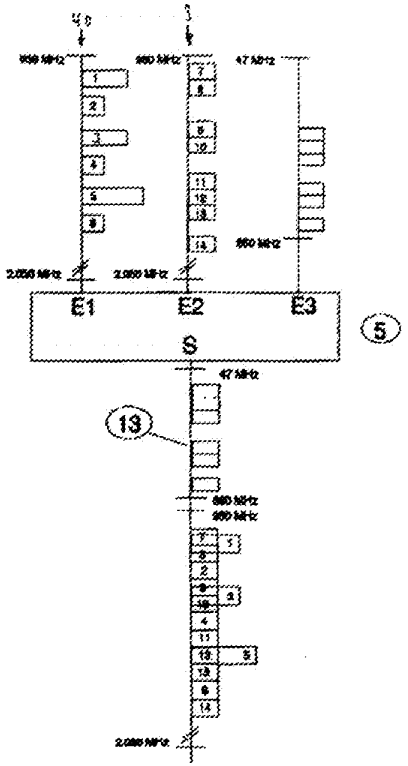
| |  <br>Figur 5<br>Carnero at 10:1-5:<br><br>After the mixing process has been carried out in the second mixer 5, one or more channels shown in Figure 10 will be received, these channels then being distributed via the single distribution cable 13. In this case, as illustrated in Figure 10, channel 65 is superimposed on channel 60 (cf. larger amplitude of 65 compared to 60), channel 72 on channel 36, channel 68 on channel 44, channel 82 on channel 2, channel 77 on channel 6, channel 17 on channel 12, channel 89 on channel 18, and channel 41 on channel 24. |

| Asserted Claims | Carnero |
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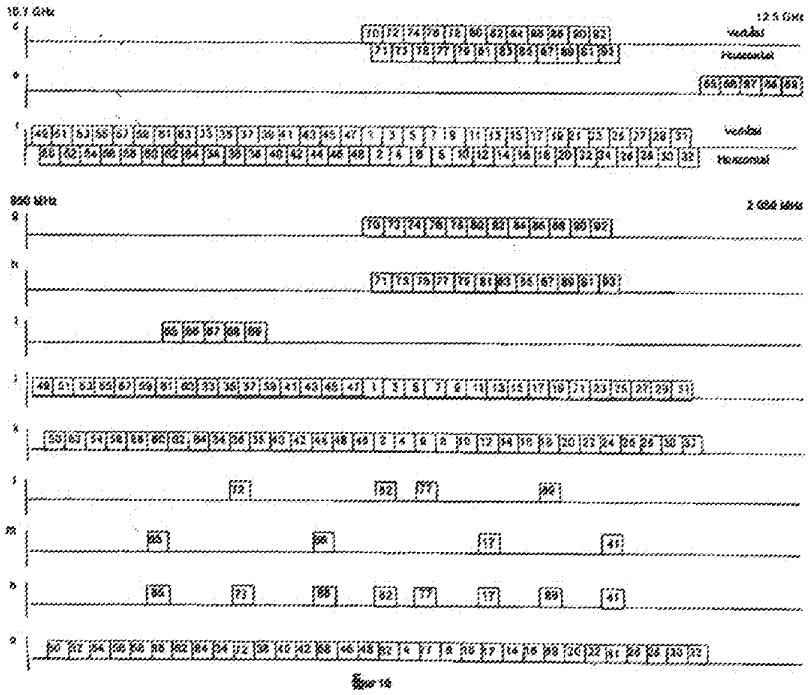
| | Carnero at Fig. 10:<br>  <br>Carnero at Claim 10:<br><br>10. A system according to any one of the preceding claims, characterized in that the system includes a second mixer (5), having at least two inputs (E1, E2, E3), that one of the inputs (E1) is connectable to the output of the converter module (40), that another input (E2, E3) is connectable to a down converter (LNA/LNB 2), and that the second mixer (5) has an output (S), to which the distribution cable (13) is can be connected. |

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| | To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Carnero discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Carnero at page 4:<br><br>The signal distribution system shown in the drawings, as well as in Figure 3, consists of three blocks A, B and C. Block A is a signal generator, block B is a head device with a signal processing unit and block C represents the distribution network.<br><br>Blocks A, B and C are designed as follows:<br><br>1. Block A is a signal generator consisting of at least one antenna 1 and known down converters 2 (low-noise amplifier LNA, low-noise block converter LNB). The received signals may originate from different broadcast and/or telecommunications satellites and/or have different polarities (horizontal, vertical). The down-converters 2 convert the received signals, in an already known way, from the received frequency range of, for example, 11.7 - 12.5 GHz; 10.7 - 11.7 GHz; 12.5 - 12.75 GHz or preferably 10.7 - 12.5 GHz into an intermediate frequency range of, for example, 950 - 1760 MHz or preferably 950 MHz and 2,050 MHz. |

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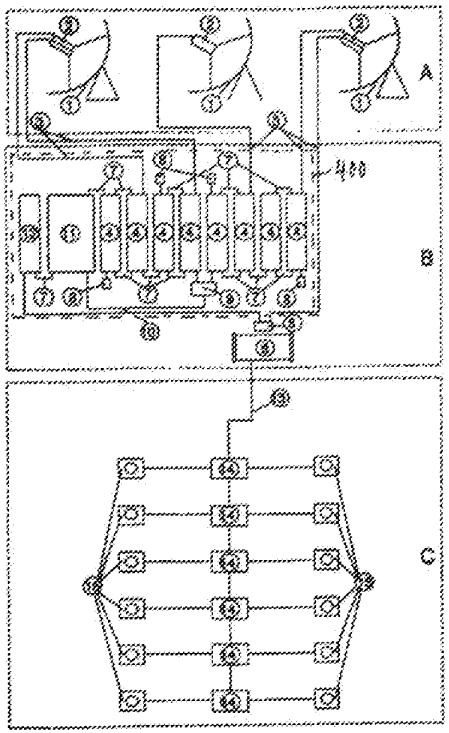
| | 2. Block B is a head device with a signal processing device 400, in which channel-specific converters 4 are arranged. The channel-specific converters 4 are described in more detail, in particular, with reference to Figure 7. Various designs of the signal processing device 400 are shown in Figures 3, 4, 5, and 6;<br><br>3. The distribution network C has a single distribution cable 13, through which the signals are transmitted to user outlets 15, via tapping or diverters 14.<br><br>Carnero at Fig. 3:<br><br>  <br> |

| Asserted Claims | Carnero |
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| | Carnero at 9:15-20:<br><br>Therefore, channels in the frequency band from 47 to 860 MHz and channels 1, 2, 3, 4, 11, 5, 13, 6 and 14 in the frequency band from 950 to 2,050 MHz are made available to the system user. Similarly, channels 7, 8, 9, 10 and 12 are transmitted on distribution cable 13. However, these channels are overlaid, so that they are not made available to the system user. With the signal level difference of at least 15 dB provided according to the invention, the overlapping channels can be displayed in good reception quality in the terminals, that can be connected to the user outlets.<br><br>To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Carnero discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>*See, e.g.*:<br><br>Carnero at 3:48-53:<br><br>The channel-specific converters may each have a microprocessor, that controls at least one oscillator. The microprocessor allows a converter-external input device to be detachably connected to the microprocessor and data to be input to the converter and the microprocessor, respectively, designating a predeterminable input channel frequency and a predeterminable output channel frequency. In this way, the channel-specific converters can be easily set to a pre-definable input frequency and a pre-definable output frequency, by |

| Asserted Claims | Carnero |
|---|---|
| | which the frequency conversion of a channel is determined. The converter-external input device can also be designed as a remote-controlled transmitter.<br><br>Carnero at 7:55-60:<br><br>The mixer 52 connected downstream of the amplifier 51 mixes the signal of the frequency 479.5 MHz, selected at the input, with a signal formed by a local oscillator (OL) 53. The local oscillator is controlled by a PLL circuit 54. The PLL circuit 54 is also controlled by the microprocessor 49. A tracking filter 55 is connected downstream of the mixer 52, which, like the filter 43, is a bandpass filter. The filter 55 eliminates the unwanted signals formed during the mixing done by the mixer 52. The output of filter 55 then carries the signal of the frequency-converted channel, which is fed to an amplifier 56.<br><br>Carnero at 8:4-25:<br><br>A downstream directional coupler 57 feeds the amplified signal to the outputs SC1, SC2. The outputs SC1 and SC2 are mechanically designed, in such a way, that known connecting bridges (7 in Figure 4) can be used for connecting to one output each of an adjacent channel-specific converter.<br><br>As shown in Figure 7, the converters 4 may include a microprocessor 49, that controls the PLL circuits 46 and 54 and determines the input and output frequency of the channel signal of the converters 4. Further, the microprocessor 49 may control the amplifier 56. An input unit 16 can be connected to the microprocessor 49, for example, via a 4-cable bus, through which the data of a pre-definable input and output frequency and/or control data for the amplifier 56 (signal amplification parameters) can be input into the microprocessor 49. The input unit 16 can have a control unit 162 (in particular, a microprocessor MP). A program assigned to the control unit 162 generates data as a function, for example, of the cutoff frequencies of the respective intermediate frequency range (950 MHz, 2,050 MHz), of channel bandwidths and channel spacings and signal levels of the channel signals, which corresponds to predefined technical specifications, and which is input into the microprocessor 49 of the channel-specific converter 4. The input unit 16 includes a |

| Asserted Claims | Carnero |
|---|---|
| | keyboard 161, the control unit 162 and a display 163. The display shows data entered into the keypad 161, operator guidance information, and information indicating the state of the converter after it is configured by the data entered. The input unit 16 may be designed as a remote-controlled transmitter with a transmitting device, that transmits the data to be input to a receiver connected to the microprocessor 49 of the channel-specific converter.<br><br>Carnero at Claims 6-7:<br><br>6. A system according to any one of the preceding claims, characterized in that the channel-specific converter (4) includes a microprocessor (49) controlling at least one oscillator (45, 53) of the channel-specific converter (4) and/or an amplifier (56) of the channel-specific converter (4).<br>7. A system according to claim 6, characterized in that the microprocessor (49) of the channel-specific converter (4) is connectable to an input device (16) external to the converter, via which data can be input, that designate a predeterminable input channel frequency and a predeterminable output channel frequency and/or signal gain parameters for controlling the amplifier (56).<br><br>To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Carnero discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Carnero |
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| | Carnero at page 4:<br><br>The signal distribution system shown in the drawings, as well as in Figure 3, consists of three blocks A, B and C. Block A is a signal generator, block B is a head device with a signal processing unit and block C represents the distribution network.<br><br>Blocks A, B and C are designed as follows:<br><br>1. Block A is a signal generator consisting of at least one antenna 1 and known down converters 2 (low-noise amplifier LNA, low-noise block converter LNB). The received signals may originate from different broadcast and/or telecommunications satellites and/or have different polarities (horizontal, vertical). The down-converters 2 convert the received signals, in an already known way, from the received frequency range of, for example, 11.7 - 12.5 GHz; 10.7 - 11.7 GHz; 12.5 - 12.75 GHz or preferably 10.7 - 12.5 GHz into an intermediate frequency range of, for example, 950 - 1760 MHz or preferably 950 MHz and 2,050 MHz.<br><br>2. Block B is a head device with a signal processing device 400, in which channel-specific converters 4 are arranged. The channel-specific converters 4 are described in more detail, in particular, with reference to Figure 7. Various designs of the signal processing device 400 are shown in Figures 3, 4, 5, and 6;<br><br>3. The distribution network C has a single distribution cable 13, through which the signals are transmitted to user outlets 15, via tapping or diverters 14.<br><br>Carnero at Fig. 3: |

| Asserted Claims | Carnero |
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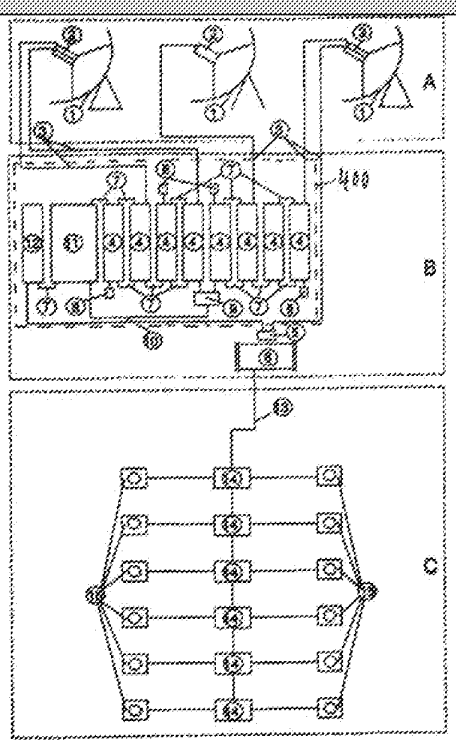
| |  <br><br>To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is | Carnero discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. |

| Asserted Claims | Carnero |
|---|---|
| communicated to devices in the network. | *See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Carnero at 3:48-53:<br><br>The channel-specific converters may each have a microprocessor, that controls at least one oscillator. The microprocessor allows a converter-external input device to be detachably connected to the microprocessor and data to be input to the converter and the microprocessor, respectively, designating a predeterminable input channel frequency and a predeterminable output channel frequency. In this way, the channel-specific converters can be easily set to a pre-definable input frequency and a pre-definable output frequency, by which the frequency conversion of a channel is determined. The converter-external input device can also be designed as a remote-controlled transmitter.<br><br>Carnero at 8:4-25:<br><br>A downstream directional coupler 57 feeds the amplified signal to the outputs SC1, SC2. The outputs SC1 and SC2 are mechanically designed, in such a way, that known connecting bridges (7 in Figure 4) can be used for connecting to one output each of an adjacent channel-specific converter.<br>As shown in Figure 7, the converters 4 may include a microprocessor 49, that controls the PLL circuits 46 and 54 and determines the input and output frequency of the channel signal of the converters 4. Further, the microprocessor 49 may control the amplifier 56. An input unit 16 can be connected to the microprocessor 49, for example, via a 4-cable bus, through which the data of a pre-definable input and output frequency and/or control data for the amplifier 56 (signal amplification parameters) can be input into the microprocessor 49. The input unit 16 can have a control unit 162 (in particular, a microprocessor MP). A program assigned to the control unit 162 generates data as a function, for example, of the cutoff frequencies of the respective intermediate frequency range (950 MHz, 2,050 MHz), of channel bandwidths and channel spacings and signal levels of the channel signals, which corresponds to predefined technical specifications, and which is input into the |

| Asserted Claims | Carnero |
|---|---|
| | microprocessor 49 of the channel-specific converter 4. The input unit 16 includes a keyboard 161, the control unit 162 and a display 163. The display shows data entered into the keypad 161, operator guidance information, and information indicating the state of the converter after it is configured by the data entered. The input unit 16 may be designed as a remote-controlled transmitter with a transmitting device, that transmits the data to be input to a receiver connected to the microprocessor 49 of the channel-specific converter.<br><br>Carnero at Claims 6-7:<br><br>6. A system according to any one of the preceding claims, characterized in that the channel-specific converter (4) includes a microprocessor (49) controlling at least one oscillator (45, 53) of the channel-specific converter (4) and/or an amplifier (56) of the channel-specific converter (4).<br><br>7. A system according to claim 6, characterized in that the microprocessor (49) of the channel-specific converter (4) is connectable to an input device (16) external to the converter, via which data can be input, that designate a predeterminable input channel frequency and a predeterminable output channel frequency and/or signal gain parameters for controlling the amplifier (56).<br><br>To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

# INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Davis '055

U.S. Patent Pub. No. 2002/0154,055 ("Davis '055") was filed on April 15, 2002 and published on October 24, 2002, and claims priority to U.S. Provisional Patent No. 60/284,593, which was filed on April 18, 2001. Davis '055 therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(e). For the reasons listed below, Davis '055 invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Davis '055 |
|---|---|
| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Davis '055 discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Davis '055 at Abstract: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Davis '055 |
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| | A satellite communication system including an interface device for distributing satellite signals received from an outdoor unit (ODU) to a plurality of indoor units (IDUs) connected to a local area network (LAN), at a particular site. Only two cables, a power cable and a cable connected to the LAN, must be installed between the interface device and the site containing the IDUs. Accordingly, the installation of IDUs at a site is simplified and has the flexibility of allowing future satellite based services to be added without requiring the installation of new cables between the ODU and the IDUs. The satellite communication system also permit flexibility among connected devices, including to which other devices they are connected, how they are connected to other devices and what types of connections are used.<br><br>Davis '055 at [0002]:<br><br>This invention relates generally to the connection of a satellite antenna to multiple indoor units (IDUs), and more specifically, to an interface which connects at least one satellite antenna to multiple indoor units by means of a local area network (LAN).<br>Davis '055 at [0013]:<br><br>The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU.<br><br>Davis '055 at [0014]:<br><br>A first aspect of the present invention embodies an apparatus acting as an interface between a satellite antenna and a plurality of IDUs in a satellite communication system. |

| Asserted Claims | Davis '055 |
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| | This interface device includes a cable connection to each LNB output of the antenna, similar to a conventional multiswitch. Unlike a multiswitch, however, the interface device requires at most two additional cables, regardless of the number of IDUs in the system. One of these cables connects the interface device to a power source, while the other cable is a connection to a wired LAN, which is further connected to all of the IDUs. In this aspect, the interface device may include a processor that runs a set of protocols for controlling the transmission of data over the network. Further, the interface device may be built into the satellite antenna, or alternatively, may be configured as a standalone device within or outside of a building housing the IDUs.<br><br>Davis '055 at [0037]:<br><br>FIG. 2 illustrates an exemplary embodiment of the present invention where an interface device 40 connects the LNB 13 of an ODU 10 to multiple IDUs in conjunction with a wired LAN 50. The ODU 10 includes one or more satellite antennas 11, each of which includes one (or more) LNB 13. The LNB outputs are then connected via cables 22 to the interface device 40. Interface device 40 includes two output cables, including a power cable 25 connected to power source 31 within site 30, and a LAN connection 27 that is connected to LAN 50 running through site 30. The LAN 50 is connected to a plurality of IDUs 32. FIG. 2 as illustrated shows a dedicated cable 27 for the LAN connection. An existing cable, such as power cable 25, could also be used for the LAN connection.<br><br>Davis '055 at Fig. 2: |

| Asserted Claims | Davis '055 |
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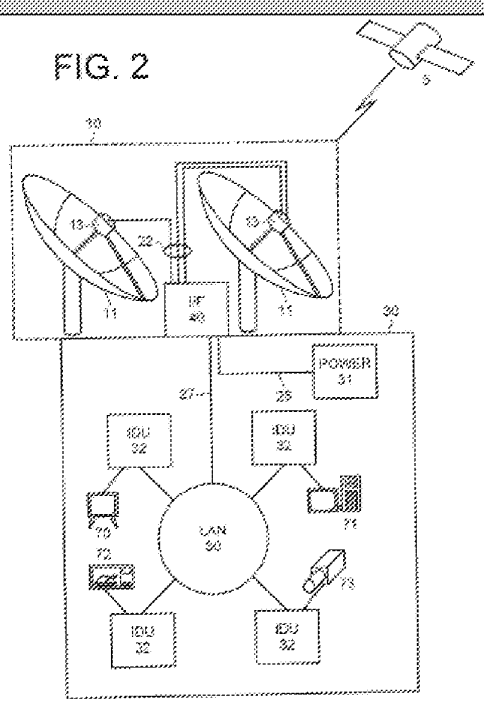
| |  <br><br>Davis '055 at [0038]:<br><br>The interface device 40 may be configured as part of the ODU 10, as shown in FIG. 2, and may even be integrated into a satellite antenna 11. Alternatively, the interface device 40 may be located apart from the ODU 10, either inside the building 30 (such as an attic) or at another outdoor location (such as on the roof). The interface device 40 may receive a single cable 22 from each LNB 13 at ODU 10. The interface device 40 may be connected to the ODU 10 via transmission cables (not shown). The transmission cables may allow the interface device 40 to send a signal to a satellite antenna 11, which is configured to transmit the signal to another site via satellite 5. |

| Asserted Claims | Davis '055 |
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| | Davis '055 at [0039]:<br><br>As shown in FIG. 2, each IDU 32 is associated with one or more satellite services. Such services may include satellite television 70, satellite based Internet service for a device 71, diagnostics/maintenance of appliances 72, and home security 73. Services such as appliance diagnostics/maintenance 72 and home security 73, may require data to be measured or collected at their corresponding IDUs 32 and transmitted back to a central processing location (not shown) for analysis. Conventional satellite communication systems (e.g., the system illustrated in FIG. 1) would require both a receiving and transmitting cable to connect these IDUs 32 to the multiswitch 20. However, by connecting the interface device 40 to each IDU 32 via LAN 50, the interface device 40 can both transmit and receive data from all of the IDUs 32 connected to a single data bus.<br><br>Davis '055 at Claim 12:<br><br>The satellite communication system of claim 1, wherein at least one of said IDUs comprises a receiver for a satellite television application.<br><br>*See also* U.S. Provisional Patent No. 60/284,593 ("Davis Provs.") at 3:<br><br>Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. |

| Asserted Claims | Davis '055 |
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| | EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?)<br><br>Minimizes number of cables to be run from the outdoor unit (maximum 2);<br><br>• Minimizes cables to be run between outdoor unit and any particular indoor unit<br><br>• Allows many indoor units to access one outdoor unit.<br><br>• Allows new indoor units/new services to be added after initial installation without any new cables<br><br>• Greatly simplifies installation in MDU's (Multi dwelling units)<br><br>• Enables subscription services like home security and diagnostics/maintenance of appliances.<br><br>Davis Provis. At 5:<br><br>The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention.<br><br>...<br><br>Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing 6ollocated6 [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method.<br>Davis Provis. At 7: |

| Asserted Claims | Davis '055 |
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| | Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be 7ollocated with the antenna, or remotely mounted.<br><br>This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.<br><br>Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Davis '055 discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Davis '055 at [0037]: |

| Asserted Claims | Davis '055 |
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| | FIG. 2 illustrates an exemplary embodiment of the present invention where an interface device 40 connects the LNB 13 of an ODU 10 to multiple IDUs in conjunction with a wired LAN 50. The ODU 10 includes one or more satellite antennas 11, each of which includes one (or more) LNB 13. The LNB outputs are then connected via cables 22 to the interface device 40. Interface device 40 includes two output cables, including a power cable 25 connected to power source 31 within site 30, and a LAN connection 27 that is connected to LAN 50 running through site 30. The LAN 50 is connected to a plurality of IDUs 32. FIG. 2 as illustrated shows a dedicated cable 27 for the LAN connection. An existing cable, such as power cable 25, could also be used for the LAN connection.<br><br>Davis '055 at Fig. 2: |

| Asserted Claims | Davis '055 |
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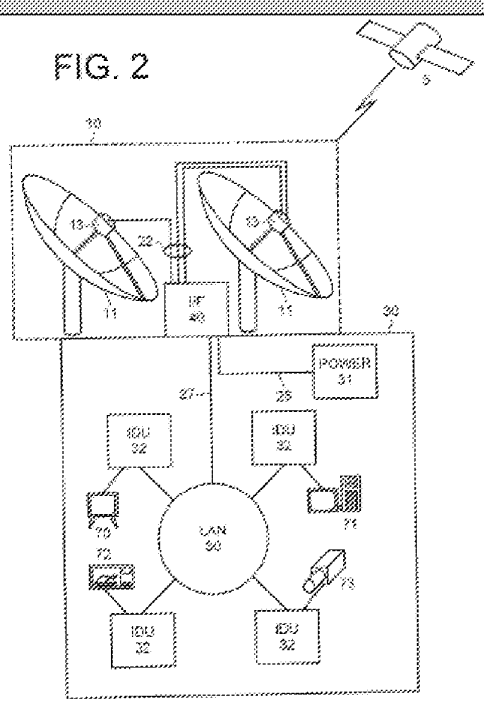
| | FIG. 2<br>  <br>Davis '055 at Fig. 3: |

| Asserted Claims | Davis '055 |
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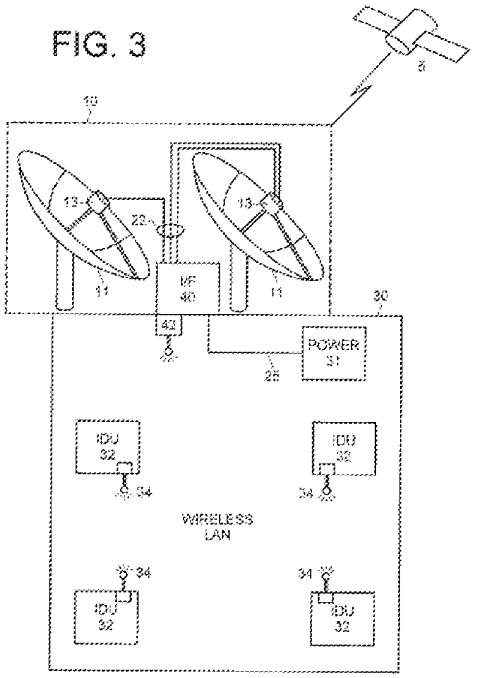
| |  <br>Davis '055 at Fig. 8: |

| Asserted Claims | Davis '055 |
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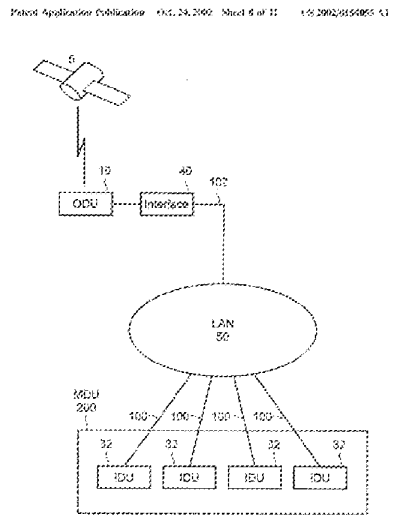
| |  <br>FIG. 8<br><br>Davis '055 at [0038]:<br><br>The interface device 40 may be configured as part of the ODU 10, as shown in FIG. 2, and may even be integrated into a satellite antenna 11. Alternatively, the interface device 40 may be located apart from the ODU 10, either inside the building 30 (such as an attic) or at another outdoor location (such as on the roof). The interface device 40 may receive a single cable 22 from each LNB 13 at ODU 10. The interface device 40 may be connected to the ODU 10 via transmission cables (not shown). The transmission cables may allow the interface device 40 to send a signal to a satellite antenna 11, which is configured to transmit the signal to another site via satellite 5. |

| Asserted Claims | Davis '055 |
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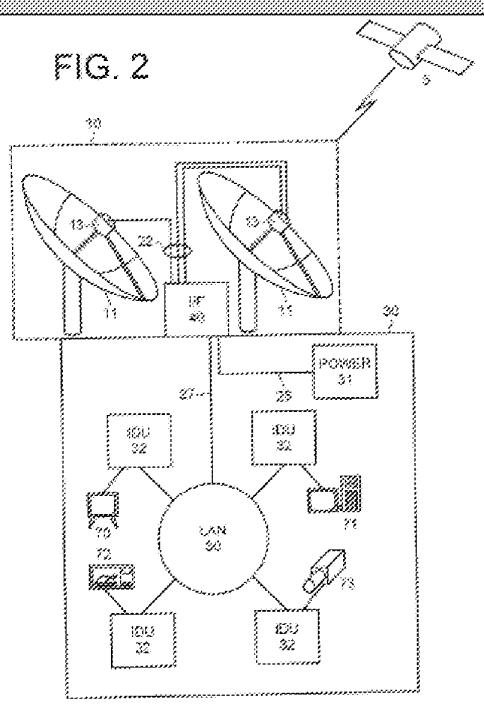
| | Davis '055 at [0059]:<br><br>In the exemplary embodiment of FIG. 3, the network protocols and services processing unit 45 of the interface device 40 may broadcast each baseband signal packet to all of the IDU transmitter/receivers 34. A processor within each IDU 32 can examine the received packets and determine whether or not the data was intended for the IDU 32. Alternatively, each IDU transmitter/receiver 34 can be configured to receive signals on different frequencies, and the interface device 40 can employ point-to-point communication by transmitting directly to an IDU 32 over the frequency corresponding to the IDU's transmitter/receiver 34.<br><br>*See also* Davis Provs. At 3:<br><br>Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables.<br><br>EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?)<br><br>• Minimizes number of cables to be run from the outdoor unit (maximum 2);<br><br>• Minimizes cables to be run between outdoor unit and any particular indoor unit<br><br>• Allows many indoor units to access one outdoor unit. |

| Asserted Claims | Davis '055 |
|---|---|
| | • Allows new indoor units/new services to be added after initial installation without any new cables<br><br>• Greatly simplifies installation in MDU's (Multi dwelling units)<br><br>• Enables subscription services like home security and diagnostics/maintenance of appliances.<br><br>Davis Provis. at 5:<br><br>The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention.<br><br>…<br><br>Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method.<br><br>Davis Provis. at 7:<br><br>Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted.<br><br>This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted |

| Asserted Claims | Davis '055 |
|---|---|
| | information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.<br><br>Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Davis '055 discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Davis '055 at [0013]:<br><br>The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to |

| Asserted Claims | Davis '055 |
|---|---|
| | its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU.<br><br>Davis '055 at [0036]:<br><br>In the satellite communication system illustrated in FIG. 1, the satellite signals may already be encrypted when they are received by ODU 10 and sent to the IDUs 32A and 32B. Accordingly, IDUs 32A and 32B may comprise Integrated Receiver Decoders (IRDs), which include a processor for decrypting or descrambling the received signal. Further, IRDs may perform other functions, such as providing an electronic program guide (EPG) or recording certain programs on satellite TV signals.<br><br>Davis '055 at [0037]:<br><br>FIG. 2 illustrates an exemplary embodiment of the present invention where an interface device 40 connects the LNB 13 of an ODU 10 to multiple IDUs in conjunction with a wired LAN 50. The ODU 10 includes one or more satellite antennas 11, each of which includes one (or more) LNB 13. The LNB outputs are then connected via cables 22 to the interface device 40. Interface device 40 includes two output cables, including a power cable 25 connected to power source 31 within site 30, and a LAN connection 27 that is connected to LAN 50 running through site 30. The LAN 50 is connected to a plurality of IDUs 32. FIG. 2 as illustrated shows a dedicated cable 27 for the LAN connection. An existing cable, such as power cable 25, could also be used for the LAN connection.<br><br>Davis '055 at Fig. 2: |

| Asserted Claims | Davis '055 |
|---|---|
| |  <br><br>Davis '055 at [0038]:<br><br>The interface device 40 may be configured as part of the ODU 10, as shown in FIG. 2, and may even be integrated into a satellite antenna 11. Alternatively, the interface device 40 may be located apart from the ODU 10, either inside the building 30 (such as an attic) or at another outdoor location (such as on the roof). The interface device 40 may receive a single cable 22 from each LNB 13 at ODU 10. The interface device 40 may be connected to the ODU 10 via transmission cables (not shown). The transmission cables may allow the interface device 40 to send a signal to a satellite antenna 11, which is configured to transmit the signal to another site via satellite 5. |

| Asserted Claims | Davis '055 |
|---|---|
| | Davis '055 at [0039]:<br><br>As shown in FIG. 2, each IDU 32 is associated with one or more satellite services. Such services may include satellite television 70, satellite based Internet service for a device 71, diagnostics/maintenance of appliances 72, and home security 73. Services such as appliance diagnostics/maintenance 72 and home security 73, may require data to be measured or collected at their corresponding IDUs 32 and transmitted back to a central processing location (not shown) for analysis. Conventional satellite communication systems (e.g., the system illustrated in FIG. 1) would require both a receiving and transmitting cable to connect these IDUs 32 to the multiswitch 20. However, by connecting the interface device 40 to each IDU 32 via LAN 50, the interface device 40 can both transmit and receive data from all of the IDUs 32 connected to a single data bus.<br><br>Davis '055 at [0048]:<br><br>The network protocols and services unit 45 may also receive packets from the LAN 50, via LAN interface 46, which contain data to be transmitted to another site 30 over the satellite network. Accordingly, the network protocols and services unit 45 can reassemble the packets into the original digital baseband signal. The reassembled signal may be sent to transmission signal processing unit 42, where it is processed and converted back into an RF signal, suitable for transmission. The converted RF signal is then sent back to a transmitting antenna via LNB interface 41 and cable 22.<br><br>Davis '055 at [0055]:<br><br>By utilizing the wired LAN 50 of the present invention, a plurality of IDUs 32 (PCs) configured for satellite Internet service can receive content from the same satellite antenna 11 without requiring a plurality of cables running from the ODU 10 to the IDU. Further, each IDU 32 can transmit requests over the same cable connection, which connects the data bus of LAN 50 to the ISP. |

| Asserted Claims | Davis '055 |
|---|---|
| | Davis '055 at [0065]:<br><br>According to this exemplary embodiment, a signal is transmitted via satellite 5 to the ODU 10, which sends the received signal to the interface device 40. The interface device 40 then sends the satellite data to the server application 36, which stores the data in storage device 38. Any of the IDUs 32 may send requests to the server application 36 over the wired LAN 50 for accessing the data stored in storage device 38. If the server application 36 accepts a request from an IDU 32, the data will be downloaded to the requesting IDU 32 over the LAN 50. In a further exemplary embodiment, the server application 36 may accept an IDU's request only after the user of the IDU 32 agrees to pay a fee for downloading the requested data.<br><br>Davis '055 at [0073]:<br><br>FIG. 10 illustrates yet another embodiment of the present invention, where the interface 40 acts as an converter and/or concentrator. As illustrated in FIG. 10, the interface 40 may receive information from any number of connections, such as DSL, satellite, cable, among others. The interface 40 may also receive information from other wide area products and from other devices such as CD players. The interface 40 may convert/concentrate the received information for forwarding to LAN 50. Interface 40 may also include outgoing connections for sending control/request information to any of the information sources illustrated in FIG. 10.<br><br>*See also* Davis Provs. at 3:<br><br>Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard |

| Asserted Claims | Davis '055 |
|---|---|
| | interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables.<br><br>Davis Provis. at 5:<br><br>The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention.<br><br>…<br><br>Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method.<br><br>Davis Provis. at 7:<br><br>Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted.<br><br>This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. |

| Asserted Claims | Davis '055 |
|---|---|
| | Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Davis '055 discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Davis '055 at [0013]:<br><br>The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU.<br><br>Davis '055 at [0045]:<br><br>The operation of the interface device 40 will now be described in connection with FIGS. 2 and 5. Once the RF signal transmitted by a satellite 5 is received into a particular LNB 13, |

| Asserted Claims | Davis '055 |
|---|---|
| | the signal may be sent to a corresponding input/output port of LNB interface 41. The RF signal may then be sent to the received signal processing and encryption unit 44, where the signal is converted into a digital baseband signal. The received signal processing and encryption unit 44 may perform other signal processing on the baseband signal, such as filtering noise and other unwanted information. In addition, the received signal processing and encryption unit 44 may encrypt the digital baseband signal, such that only IDUs having a certain decryption key will be able to decrypt the signal and access the information contained therein.<br><br>*See also* Davis Provs. at 3:<br><br>Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables.<br><br>EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?)<br><br>• Minimizes number of cables to be run from the outdoor unit (maximum 2);<br><br>• Minimizes cables to be run between outdoor unit and any particular indoor unit.<br><br>• Allows many indoor units to access one outdoor unit. |

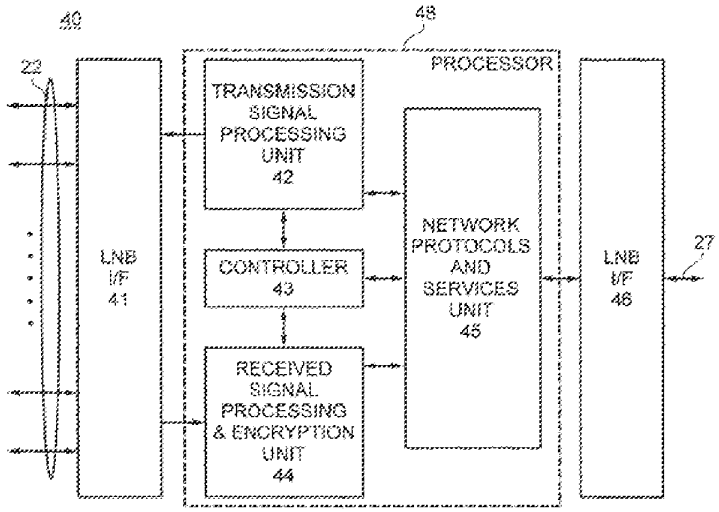
| Asserted Claims | Davis '055 |
|---|---|
| | • Allows new indoor units/new services to be added after initial installation without any new cables<br><br>• Greatly simplifies installation in MDU's (Multi dwelling units)<br><br>• Enables subscription services like home security and diagnostics/maintenance of appliances.<br><br>Davis Provis. at 5:<br><br>The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention.<br><br>…<br><br>Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method.<br><br>Davis Provis. at 7:<br><br>Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted.<br><br>This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted |

| Asserted Claims | Davis '055 |
|---|---|
| | information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.<br><br>Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Davis '055 discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Davis '055 at [0013]:<br><br>The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU. |

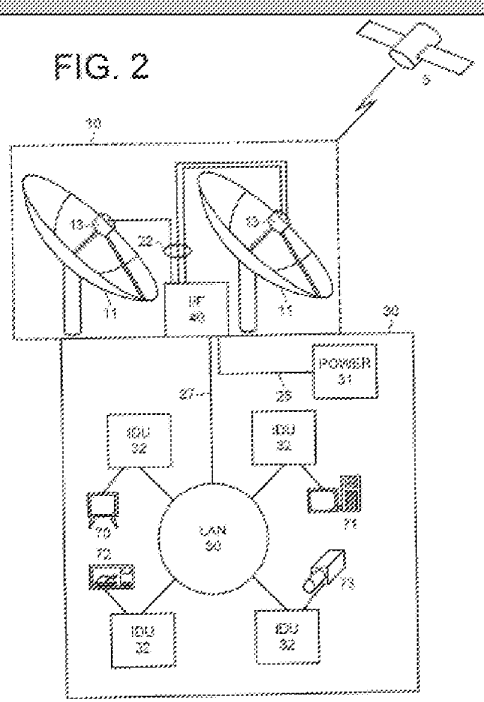
| Asserted Claims | Davis '055 |
|---|---|
| | Davis '055 at [0041]:<br><br>The elements of the LNB interface 41 may be conventional elements, such as a tuner/demodulator pair for processing an input from each cable 22. The tuner/demodulator pair processes an RF input from each cable 22 and produces a corresponding digital output. The digital outputs from each tuner/demodulator pair are multiplexed together and sent to the received signal processing and encryption unit 44. Similarly, the output from the transmission signal processing unit 42 is demultiplexed into plural inputs, sent to tuner/modulator pairs for conversion back into RF signals and sent out of cables 22.<br>*See also* Davis Provs. at 3:<br><br>Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables.<br><br>EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?)<br><br>• Minimizes number of cables to be run from the outdoor unit (maximum 2);<br><br>• Minimizes cables to be run between outdoor unit and any particular indoor unit<br><br>• Allows many indoor units to access one outdoor unit. |

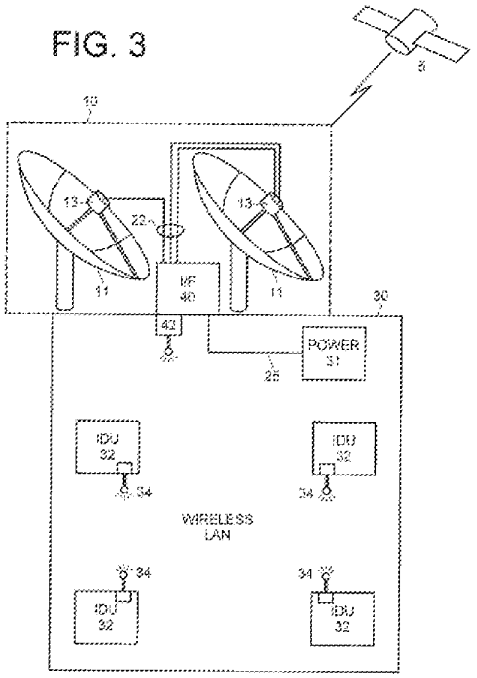
| Asserted Claims | Davis '055 |
|---|---|
| | • Allows new indoor units/new services to be added after initial installation without any new cables<br><br>• Greatly simplifies installation in MDU's (Multi dwelling units)<br><br>• Enables subscription services like home security and diagnostics/maintenance of appliances.<br><br>Davis Provis. at 5:<br><br>The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention.<br><br>…<br><br>Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method.<br><br>Davis Provis. at 7:<br><br>Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted.<br><br>This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted |

| Asserted Claims | Davis '055 |
|---|---|
| | information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.<br>Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Davis '055 discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Davis '055 at [0037]:<br><br>FIG. 2 illustrates an exemplary embodiment of the present invention where an interface device 40 connects the LNB 13 of an ODU 10 to multiple IDUs in conjunction with a wired LAN 50. The ODU 10 includes one or more satellite antennas 11, each of which includes one (or more) LNB 13. The LNB outputs are then connected via cables 22 to the interface device 40. Interface device 40 includes two output cables, including a power cable 25 connected to power source 31 within site 30, and a LAN connection 27 that is connected to LAN 50 running through site 30. The LAN 50 is connected to a plurality of IDUs 32. FIG. 2 as illustrated shows a dedicated cable 27 for the LAN connection. An existing cable, such as power cable 25, could also be used for the LAN connection. |

| Asserted Claims | Davis '055 |
|---|---|
| | Davis '055 at [0043]:<br><br>It should be noted that the transmission signal processing unit 42, received signal processing and encryption unit 44, network protocols and services unit 45, and controller 43 may comprise separate hardware units. Alternatively, a single processor 48 (designated by the dotted line in FIG. 5) may be configured to perform the functions of processing units 42-45. The interface device 40 may be configured as any combination of hardware and software units for performing the functions shown in FIG. 5.<br><br>Davis '055 at Fig. 5:<br><br>  <br><br>FIG. 5<br><br>Davis '055 at [0046]: |

| Asserted Claims | Davis '055 |
|---|---|
| | The processed digital signal may then be sent to the network protocols and Services processing unit 45, which assembles the data into message packets, determines the destination address of each packet, and controls the transmission of such packets according to a set of network protocols. The specific software for running these network protocols may be Stored in controller 43. The message packets are then transmitted to the LAN 50 through LAN interface 46 and LAN cable 27.<br><br>Davis '055 at [0058]:<br><br>In FIG. 3, the interface device 40 includes an RF signal transmitter/receiver 42 for transmitting data to and/or for receiving data from each of the IDUs 32 over the wireless LAN. The RF transmitter/receiver 42 of the interface device 40 replaces the LAN cable 27 illustrated in FIGS. 2 and 5. Each of the IDUs 32 includes an RF signal transmitter/receiver 34 for receiving data transmitted by the interface device 40. If a particular IDU 32 does not require the capability of transmitting data over the satellite communication network, then the RF transmitter/receiver 34 for the IDU 32 may be operable only to receive RRF [sic] signals.<br><br>Davis '055 at Fig. 2: |

| Asserted Claims | Davis '055 |
|---|---|
| |  <br>Davis '055 at Fig. 3: |

| Asserted Claims | Davis '055 |
|---|---|
| |  <br>Davis '055 at [0059]:<br><br>In the exemplary embodiment of FIG. 3, the network protocols and services processing unit 45 of the interface device 40 may broadcast each baseband signal packet to all of the IDU transmitter/receivers 34. A processor within each IDU 32 can examine the received packets and determine whether or not the data was intended for the IDU 32. Alternatively, each IDU transmitter/receiver 34 can be configured to receive signals on different frequencies, and the interface device 40 can employ point-to-point communication by transmitting directly to an IDU 32 over the frequency corresponding to the IDU's transmitter/receiver 34. |

| Asserted Claims | Davis '055 |
|---|---|
| | Davis '055 at [0061]:<br><br>The use of a wireless LAN as illustrated in FIG. 3 provides even greater flexibility for the satellite communication system of the present invention. This embodiment allows for new services, and accordingly, new IDUs 32 to be installed at any location, without concern as to whether a connection to the LAN data bus is accessible from the location. The embodiment further allows for portable, wireless IDUs 32 to be used within site 30.<br><br>*See also* U.S. Provisional Patent No. 60/284,593 ("Davis Provs.") at 3:<br><br>Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables.<br><br>EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?)<br><br>• Minimizes number of cables to be run from the outdoor unit (maximum 2);<br><br>• Minimizes cables to be run between outdoor unit and any particular indoor unit<br><br>• Allows many indoor units to access one outdoor unit. |

| Asserted Claims | Davis '055 |
|---|---|
| | • Allows new indoor units/new services to be added after initial installation without any new cables<br><br>• Greatly simplifies installation in MDU's (Multi dwelling units)<br><br>• Enables subscription services like home security and diagnostics/maintenance of appliances.<br><br>Davis Provis. at 5:<br><br>The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention.<br>…<br><br>Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method.<br><br>Davis Provis. at 7:<br><br>Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted.<br><br>This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if |

| Asserted Claims | Davis '055 |
|---|---|
| | desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.<br><br>Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Davis '055 discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Davis '055 discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one |

| Asserted Claims | Davis '055 |
|---|---|
| | or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Davis '055 discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

**Exhibit B4 – Davis '730 Invalidity Claim Chart**

## INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Davis '730

U.S. Patent No. 6,600,730 ("Davis '730") was filed on Aug. 20, 1998 and issued on July 29, 2003. Davis '730 therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Davis '730 invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Davis '730 |
|---|---|
| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Davis '730 discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Davis '730 at Abstract: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Davis '730 |
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| | A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver.<br><br>Davis '730 at 1:10–14:<br><br>The present invention relates in general to satellite receive earth stations and, more particularly, to a system for receiving satellite signals from separate and multiple satellites and distributing the signals received from the satellites on a single cable line.<br><br>Davis '730 at 2:24–39:<br><br>The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more |

| Asserted Claims | Davis '730 |
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| | receivers at the local site for access of the separate multiple satellite communication service signals by the receivers.<br><br>Davis '730 at 2:40–56:<br><br>According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver.<br><br>Davis '730 at 3:43–54:<br><br>Referring to FIG. 2, a preferred embodiment of the satellite receiver 130 as described in the aforementioned pending application Ser. No. 08/544,423 incorporated by reference herein, has a small aperture antenna 131, a siamese feedhorn 132, two low noise blocks (LNB) 133, 134, and a feedhorn support arm 135. The antenna 131 has a boresight line 137, from which the antenna 131 receives signals with maximum gain, and a beamwidth 138 along the boresight. Signals 144 within the beamwidth 138 are reflected and focused by the antenna 131 to a focal point 140. Siamese feedhorn 132 and LNBs 133, are mounted on a feedhorn support arm 135 and positioned at the focal point 140.<br><br>Davis '730 at 4:62–5:13:<br><br>As shown in FIG. 4, each of the respectively received separate satellite signals from the separate satellites are focused by antenna 131 at a focal point where there the LNBs 133, |

| Asserted Claims | Davis '730 |
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| | 134 are located as previously described. An LNB is preferably comprised of an integrated low noise amplifier and a low noise frequency converter, and such devices are well-known to those skilled in the art. Reference may be made for instance to FIG. 5 where there is illustrated a representative LNB with an input 220 receiving signals from the antenna, and an output 229 coupling the intermediate frequency band to a receiver. Bandpass filters (BPF) 221, 222, 223 remove unwanted frequency signals while allowing desired signals to pass. Preferably, a field effect transistor (FET) amplifier 224, pre-amplifies the signal before it is mixed to the desired frequency. FET amplifier 224 is preferably a GaAs amplifier that provides a gain of 10 dB with a noise figure of 0.9 dB or less. Preferably, FET amplifier 224 provides a gain of 30 dB to 60 dB.<br><br>Davis '730 at 5:14–23:<br><br>Local oscillator (LO) 225 and Schottky diode 226 mix the signal to the desired frequency. The signal is then amplified by amplifier stage 227 before being sent but on a shielded coaxial line 229 to an indoor receiver. A voltage regulator 228 preferably regulates the voltage provided by the LNB to the indoor receiver and incorporates a voltage level switch control for selecting either the right-hand or left-hand polarized signals in response to a switch control signal from the indoor receiver in a manner well-known to those skilled in the art.<br><br>Davis '730 at 5:24–32:<br><br>The LNBs 133, 134 detect signals relayed from the feedhorn 132, convert the signals to an electrical current, amplify the signals, and downconvert the signals to a lower frequency. LNBs typically downconvert signals from the received satellite carrier frequencies to intermediate frequencies between 900 MHz and 2000 MHz. In the preferred embodiment, the LNB downconverts the satellite carrier signals to the intermediate frequency range of 950 to 1450 MHz.<br><br>Davis '730 at 5:33–47: |

| Asserted Claims | Davis '730 |
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| | Typically, only the RHCP signals or the LHCP signals are converted down to the intermediate frequency, depending on which particular receiver channel a DTV user is viewing. That is, when the viewer selects a particular DTV channel, an appropriate voltage switch control level is supplied to the LNB in a known manner to control the local oscillator 225 so as to provide either the RHCP or the LHCP signals for return to the indoor receiver. However, in systems having a dual mode or two-channel LNB, as well-known to those skilled in the art, both RHCP LHCP signals may be individually shifted down to a 500 MHz portion of L-Band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, each like output line 229, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit.<br><br>Davis '730 at 5:48–61:<br><br>Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308.<br><br>Davis '730 at 6:15–32:<br><br>Reference may be made now to FIG. 8 wherein there is illustrated a local earth site distribution system 330 which enables each of the users at terminals 332, 334 . . . 340 to have access to both the left-hand as well as the right-hand DTV signals from satellites 105 a, 105 b, as well as having access to the DPC signals from satellite 104. In the embodiment 330 shown in FIG. 8, the receiving antenna 331 includes an LNB with three outputs. One of the LNB outputs is a downconverted intermediate frequency from satellite 105 a, 105 b representing the left-hand polarized signals in the range 950 MHz to 1450 MHz, and is |

| Asserted Claims | Davis '730 |
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| | labelled DTV-L and is supplied on output line 342. Similarly, output line 344 contains the downconverted right-hand polarized portion of the 950 MHz to 1450 MHz signals from satellites 105 a, 105 b and is indicated in FIG. 8 as DTVR. The third output line 346 of the LNB provides the downconverted intermediate frequencies received from satellite 104, and this output line is accordingly labelled DPC.<br><br>Davis '730 at 6:33–50:<br><br>The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b) shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing.<br><br>Davis '730 at 6:51–68:<br><br>A demultiplexer 354 includes respective inputs for receiving output lines 350 and 352, and also an input line 356 containing VHF/UHF broadcast signals. Demultiplexer 354 includes output lines 358 each of which can supply any of the signals from input lines 350, 352 and 356 for coupling to the respective terminals 332, 334 . . . 340. For instance, the IRD 1 unit coupled to terminal 332 has access to all of the signals received from both of the separate satellites 105 a, 105 b as well as from satellite 104. Coupling of the selected signals is accomplished automatically in a well-known manner, such as by using voltage biased levels supplied from IRD 1 to a switch selector in the multiplexer 354 to accomplish the selection of the particular signal desired. This switch selection may be accomplished in a |

| Asserted Claims | Davis '730 |
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| | manner similar to that previously described with respect to existing LNBs. Demultiplexer 354 is a standard commercially available unit, such as Channelmaster model 63141FD, or similar available units such as.<br><br>Davis '730 at Fig. 4: |

| Asserted Claims | Davis '730 |
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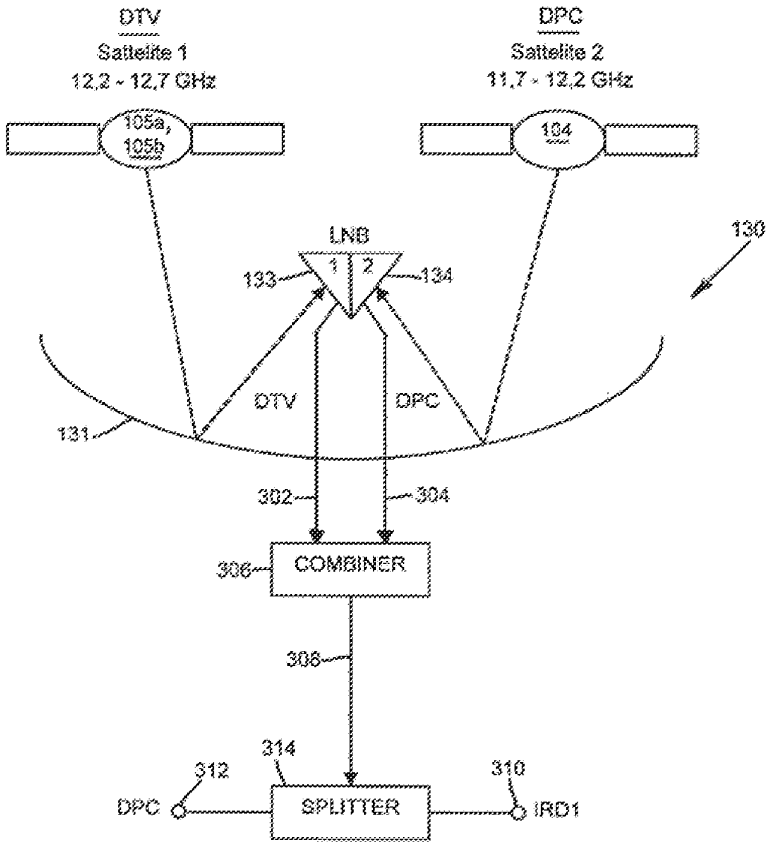
| |  <br>FIG. 4<br>Davis '730 at Fig. 8: |

| Asserted Claims | Davis '730 |
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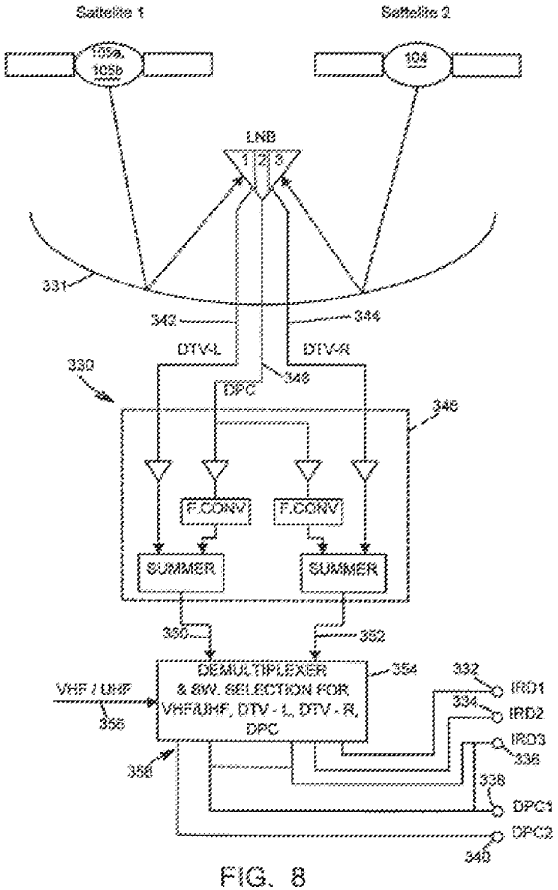
| |  <br>FIG. 8<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one |

| Asserted Claims | Davis '730 |
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| | or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Davis '730 discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Davis '730 at Abstract:<br><br>A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver.<br><br>Davis '730 at 5:48–61:<br><br>Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each |

| Asserted Claims | Davis '730 |
|---|---|
| | of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308.<br><br>Davis '730 at 6:51–68:<br><br>A demultiplexer 354 includes respective inputs for receiving output lines 350 and 352, and also an input line 356 containing VHF/UHF broadcast signals. Demultiplexer 354 includes output lines 358 each of which can supply any of the signals from input lines 350, 352 and 356 for coupling to the respective terminals 332, 334 . . . 340. For instance, the IRD 1 unit coupled to terminal 332 has access to all of the signals received from both of the separate satellites 105 a, 105 b as well as from satellite 104. Coupling of the selected signals is accomplished automatically in a well-known manner, such as by using voltage biased levels supplied from IRD 1 to a switch selector in the multiplexer 354 to accomplish the selection of the particular signal desired. This switch selection may be accomplished in a manner similar to that previously described with respect to existing LNBs. Demultiplexer 354 is a standard commercially available unit, such as Channelmaster model 63141FD, or similar available units such as.<br><br>Davis '730 at Fig. 4: |

| Asserted Claims | Davis '730 |
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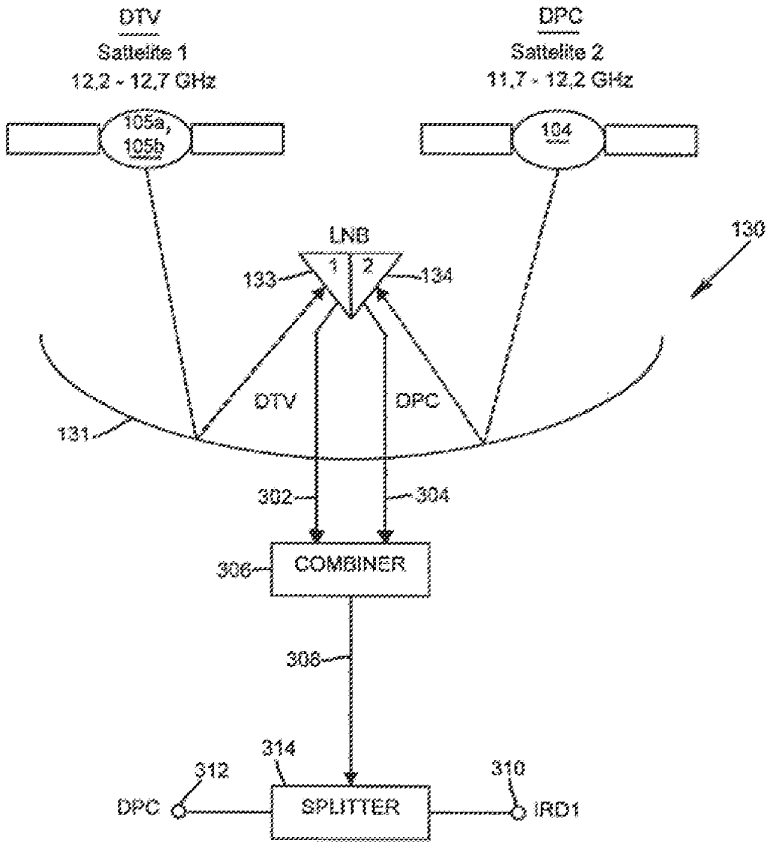
| |  <br>FIG. 4<br>Davis '730 at Fig. 8: |

| Asserted Claims | Davis '730 |
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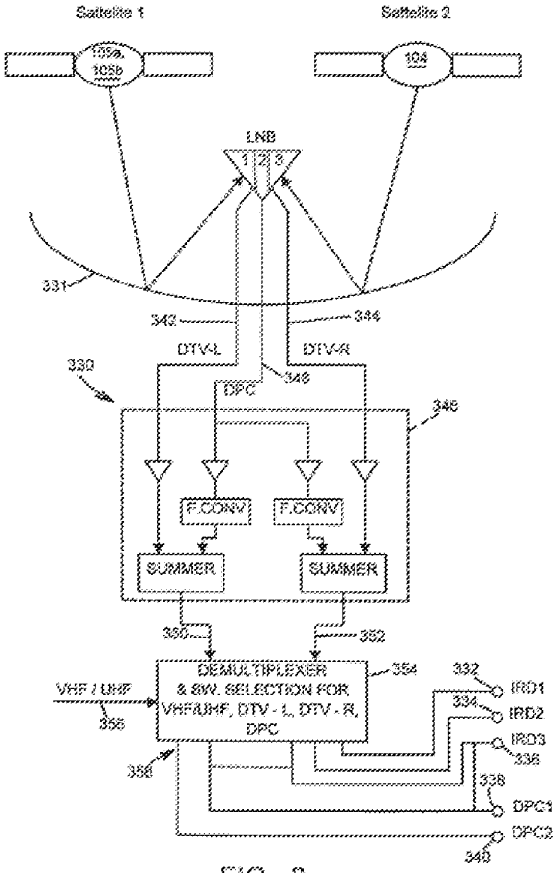
| |  <br>FIG. 8<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one |

| Asserted Claims | Davis '730 |
|---|---|
| | or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Davis '730 discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Davis '730 at Abstract:<br><br>A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver.<br><br>Davis '730 at 2:40–56:<br><br>According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite |

| Asserted Claims | Davis '730 |
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| | system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver.<br><br>Davis '730 at 5:14–23:<br><br>Local oscillator (LO) 225 and Schottky diode 226 mix the signal to the desired frequency. The signal is then amplified by amplifier stage 227 before being sent but on a shielded coaxial line 229 to an indoor receiver. A voltage regulator 228 preferably regulates the voltage provided by the LNB to the indoor receiver and incorporates a voltage level switch control for selecting either the right-hand or left-hand polarized signals in response to a switch control signal from the indoor receiver in a manner well-known to those skilled in the art.<br><br>Davis '730 at 5:33–47:<br><br>Typically, only the RHCP signals or the LHCP signals are converted down to the intermediate frequency, depending on which particular receiver channel a DTV user is viewing. That is, when the viewer selects a particular DTV channel, an appropriate voltage switch control level is supplied to the LNB in a known manner to control the local oscillator 225 so as to provide either the RHCP or the LHCP signals for return to the indoor receiver. However, in systems having a dual mode or two-channel LNB, as well-known to those skilled in the art, both RHCP LHCP signals may be individually shifted down to a 500 MHz portion of L-Band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, each like output line 229, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. |

| Asserted Claims | Davis '730 |
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| | Davis '730 at 5:48–61:<br><br>Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308.<br><br>Davis '730 at 6:51–68:<br><br>A demultiplexer 354 includes respective inputs for receiving output lines 350 and 352, and also an input line 356 containing VHF/UHF broadcast signals. Demultiplexer 354 includes output lines 358 each of which can supply any of the signals from input lines 350, 352 and 356 for coupling to the respective terminals 332, 334 . . . 340. For instance, the IRD 1 unit coupled to terminal 332 has access to all of the signals received from both of the separate satellites 105 a, 105 b as well as from satellite 104. Coupling of the selected signals is accomplished automatically in a well-known manner, such as by using voltage biased levels supplied from IRD 1 to a switch selector in the multiplexer 354 to accomplish the selection of the particular signal desired. This switch selection may be accomplished in a manner similar to that previously described with respect to existing LNBs. Demultiplexer 354 is a standard commercially available unit, such as Channelmaster model 63141FD, or similar available units such as.<br><br>Davis '730 at Fig. 4: |

| Asserted Claims | Davis '730 |
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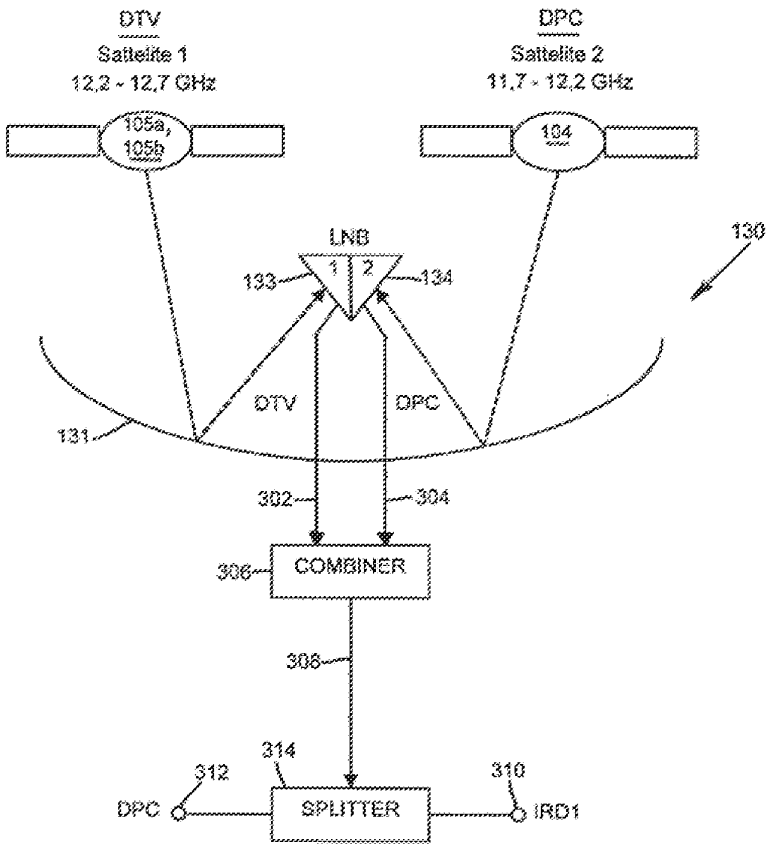
| |  <br>FIG. 4<br>Davis '730 at Fig. 5: |

| Asserted Claims | Davis '730 |
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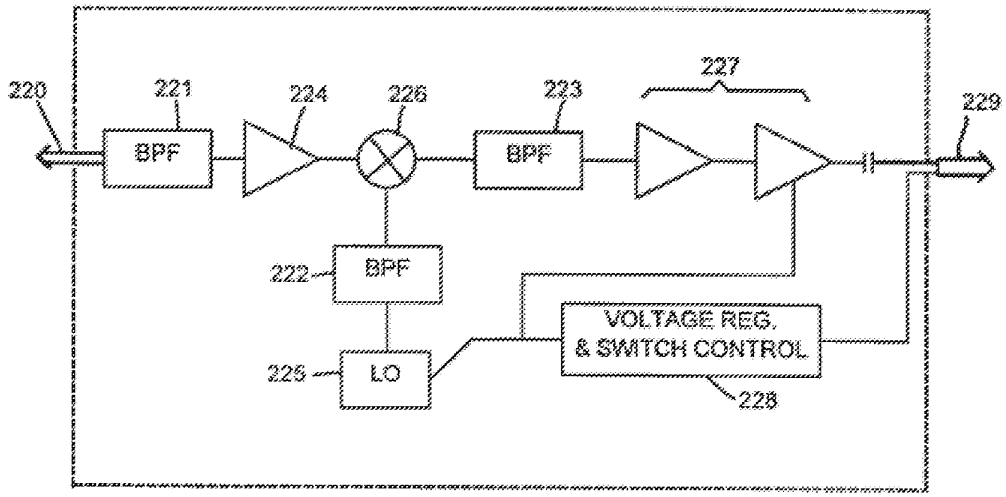
| |  <br>FIG. 5<br>Davis '730 at Fig. 8: |

| Asserted Claims | Davis '730 |
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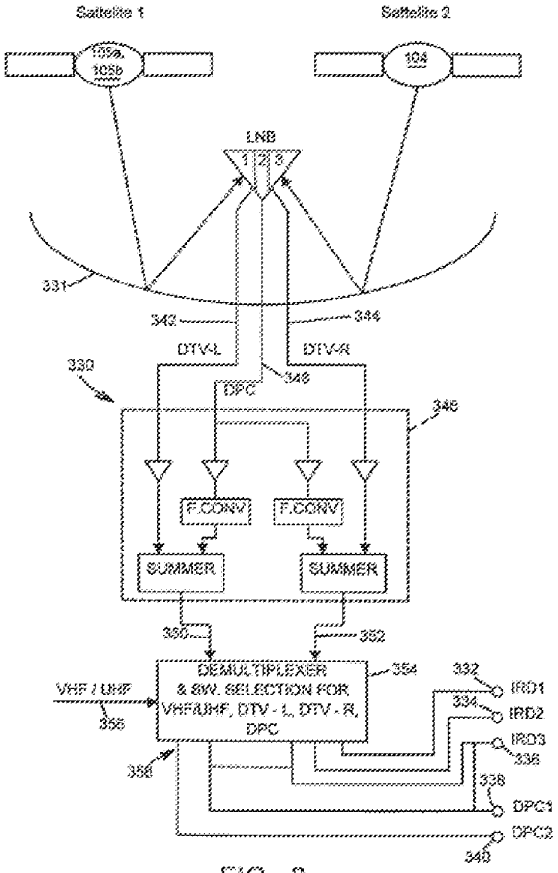
| |  <br>FIG. 8<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one |

| Asserted Claims | Davis '730 |
|---|---|
| | or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Davis '730 discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Davis '730 at Abstract:<br><br>A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver.<br><br>Davis '730 at 2:24–39:<br><br>The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and |

| Asserted Claims | Davis '730 |
|---|---|
| | converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers.<br><br>Davis '730 at 2:40–56:<br><br>According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver.<br><br>Davis '730 at 3:27–42:<br><br>Preferably, uplink transmitter 102 modulates a digital signal onto the assigned frequency carriers for uplink to satellites 105 a, 105 b. Satellites 105 a, 105 b translate the uplink carriers to the assigned Ku2-band downlink frequency carriers, (over 12 GHz), for downlink to the satellite receiver 130. The satellites 105 a, 105 b ordinarily transmit carrier signals with alternating left-hand circularly polarized (LHCP) and right-hand circularly polarized (RHCP) signals. Preferably, satellites 105 a, 105 are high-power satellites that transmit downlink signals in a focused beam pattern 108. Similarly, the uplink transmitter 101 uplinks signals to satellite 104. The satellite 104 translates the carrier signals to the assigned C-band or Ku-band downlink frequencies for subsequent demodulation and |

| Asserted Claims | Davis '730 |
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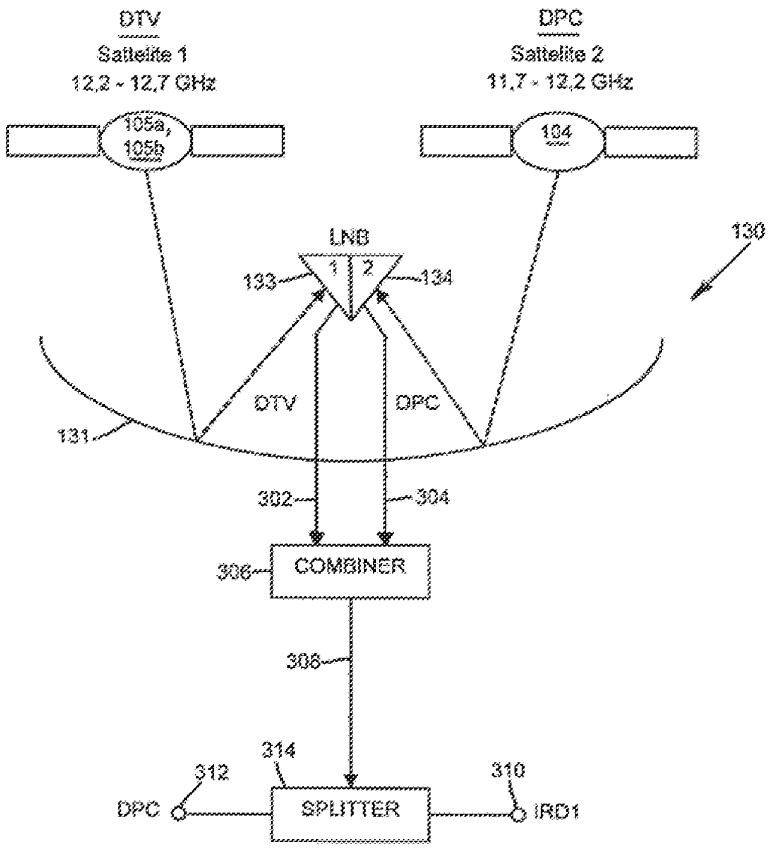
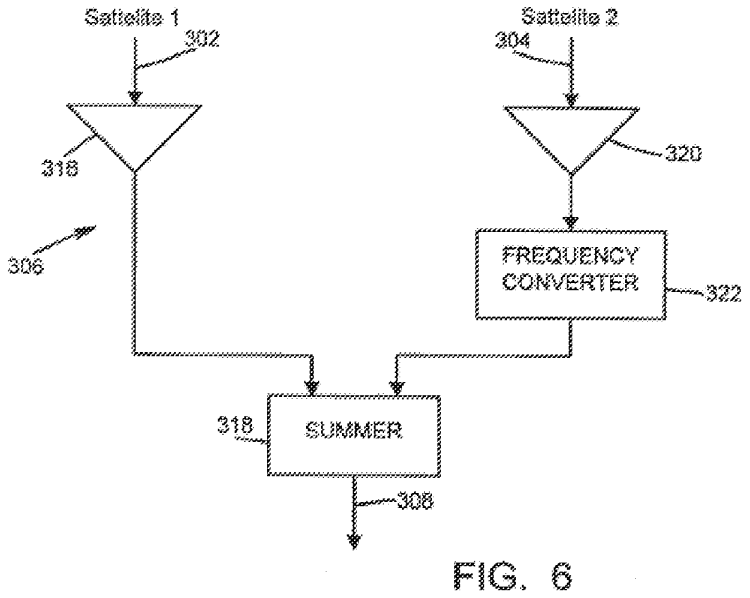
| | downlink to the satellite receiver 130. The satellite 104, ordinarily transmits carriers with alternating vertical and horizontal polarity.<br><br>Davis '730 at 4:62–5:13:<br><br>As shown in FIG. 4, each of the respectively received separate satellite signals from the separate satellites are focused by antenna 131 at a focal point where there the LNBs 133, 134 are located as previously described. An LNB is preferably comprised of an integrated low noise amplifier and a low noise frequency converter, and such devices are well-known to those skilled in the art. Reference may be made for instance to FIG. 5 where there is illustrated a representative LNB with an input 220 receiving signals from the antenna, and an output 229 coupling the intermediate frequency band to a receiver. Bandpass filters (BPF) 221, 222, 223 remove unwanted frequency signals while allowing desired signals to pass. Preferably, a field effect transistor (FET) amplifier 224, pre-amplifies the signal before it is mixed to the desired frequency. FET amplifier 224 is preferably a GaAs amplifier that provides a gain of 10 dB with a noise figure of 0.9 dB or less. Preferably, FET amplifier 224 provides a gain of 30 dB to 60 dB.<br><br>Davis '730 at 5:14–23:<br><br>Local oscillator (LO) 225 and Schottky diode 226 mix the signal to the desired frequency. The signal is then amplified by amplifier stage 227 before being sent but on a shielded coaxial line 229 to an indoor receiver. A voltage regulator 228 preferably regulates the voltage provided by the LNB to the indoor receiver and incorporates a voltage level switch control for selecting either the right-hand or left-hand polarized signals in response to a switch control signal from the indoor receiver in a manner well-known to those skilled in the art.<br><br>Davis '730 at 5:24–32:<br><br>The LNBs 133, 134 detect signals relayed from the feedhorn 132, convert the signals to an electrical current, amplify the signals, and downconvert the signals to a lower frequency. LNBs typically downconvert signals from the received satellite carrier frequencies to |

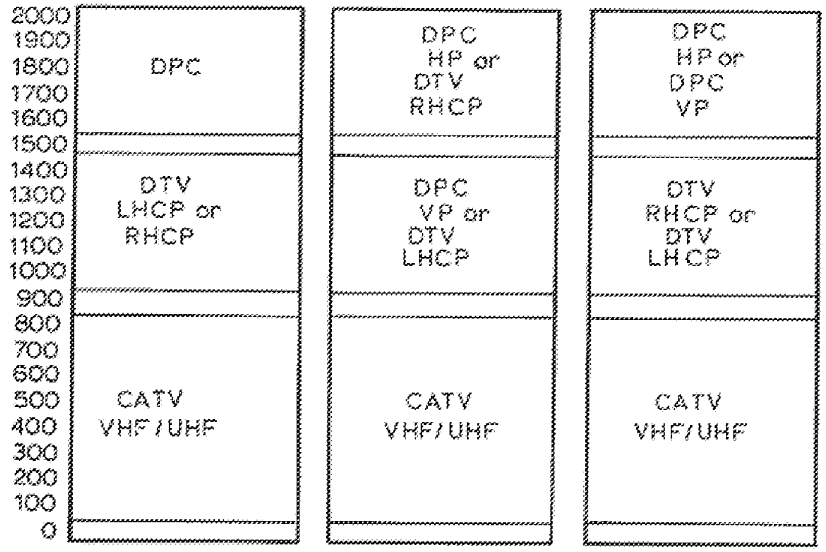
| Asserted Claims | Davis '730 |
|---|---|
| | intermediate frequencies between 900 MHz and 2000 MHz. In the preferred embodiment, the LNB downconverts the satellite carrier signals to the intermediate frequency range of 950 to 1450 MHz.<br><br>Davis '730 at 5:33–47:<br><br>Typically, only the RHCP signals or the LHCP signals are converted down to the intermediate frequency, depending on which particular receiver channel a DTV user is viewing. That is, when the viewer selects a particular DTV channel, an appropriate voltage switch control level is supplied to the LNB in a known manner to control the local oscillator 225 so as to provide either the RHCP or the LHCP signals for return to the indoor receiver. However, in systems having a dual mode or two-channel LNB, as well-known to those skilled in the art, both RHCP LHCP signals may be individually shifted down to a 500 MHz portion of L-Band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, each like output line 229, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit.<br><br>Davis '730 at 5:48–61:<br><br>Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308.<br><br>Davis '730 at 5:62–6:4:<br><br>Referring to FIG. 6, there is illustrated the details of the combiner 306. Input line 302 containing the DTV, either left-hand or right-hand polarized signals is coupled to a buffer |

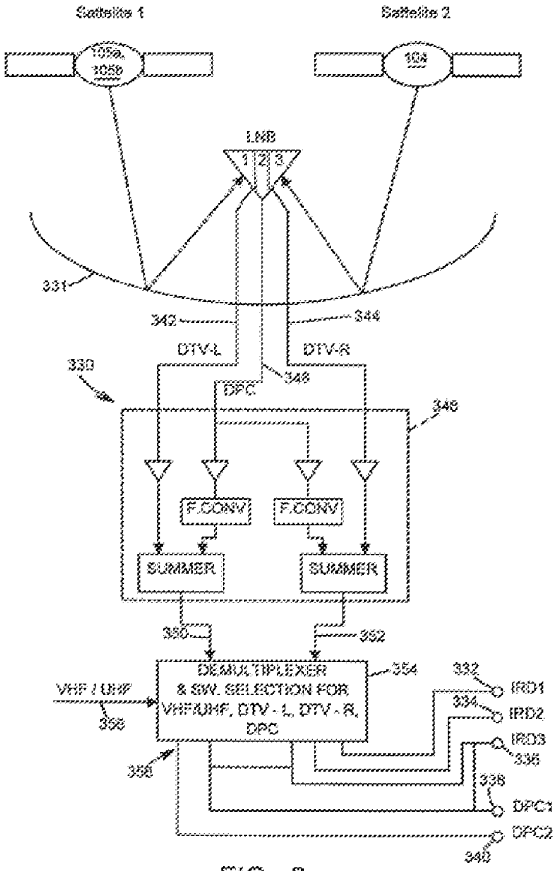
| Asserted Claims | Davis '730 |
|---|---|
| | amplifier 316 and then supplied to a summer 318. Input line 304 containing the DPC frequency band also at 950-1450 MHz is coupled to a buffer amplifier 320 and thereafter coupled to a frequency converter 322 for upconverting the 95014 1450 MHz band to a band between about 1550-2050 MHz.<br><br>Davis '730 at 6:5–14:<br><br>Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner.<br><br>Davis '730 at 6:15–32:<br><br>Reference may be made now to FIG. 8 wherein there is illustrated a local earth site distribution system 330 which enables each of the users at terminals 332, 334 . . . 340 to have access to both the left-hand as well as the right-hand DTV signals from satellites 105 a, 105 b, as well as having access to the DPC signals from satellite 104. In the embodiment 330 shown in FIG. 8, the receiving antenna 331 includes an LNB with three outputs. One of the LNB outputs is a downconverted intermediate frequency from satellite 105 a, 105 b representing the left-hand polarized signals in the range 950 MHz to 1450 MHz, and is labelled DTV-L and is supplied on output line 342. Similarly, output line 344 contains the downconverted right-hand polarized portion of the 950 MHz to 1450 MHz signals from satellites 105 a, 105 b and is indicated in FIG. 8 as DTVR. The third output line 346 of the LNB provides the downconverted intermediate frequencies received from satellite 104, and this output line is accordingly labelled DPC.<br><br>Davis '730 at 6:33–50: |

| Asserted Claims | Davis '730 |
|---|---|
| | The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b) shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing.<br><br>Davis '730 at Fig. 4: |

| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 4<br>Davis '730 at Fig. 6: |

| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 6<br>Davis '730 at Fig. 7: |

| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 7A FIG. 7B FIG. 7C<br>Davis '730 at Fig. 8: |

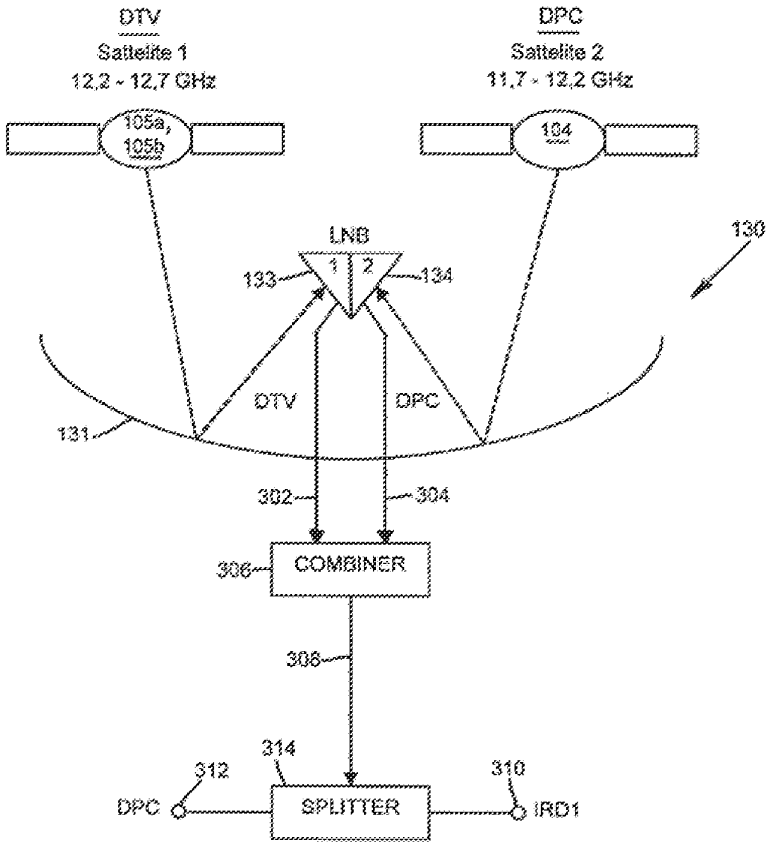
| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 8<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one |

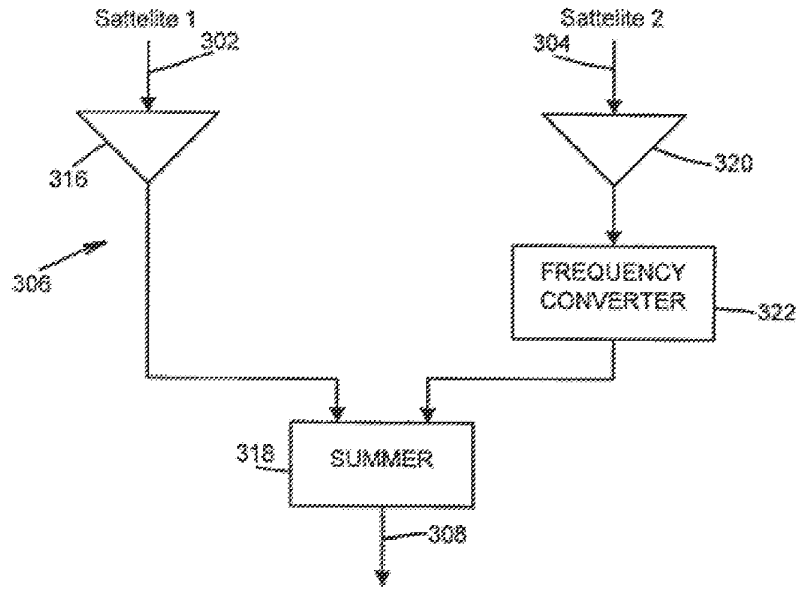
| Asserted Claims | Davis '730 |
|---|---|
| | or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Davis '730 discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Davis '730 at Abstract:<br><br>A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver.<br><br>Davis '730 at 2:24–39:<br><br>The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and |

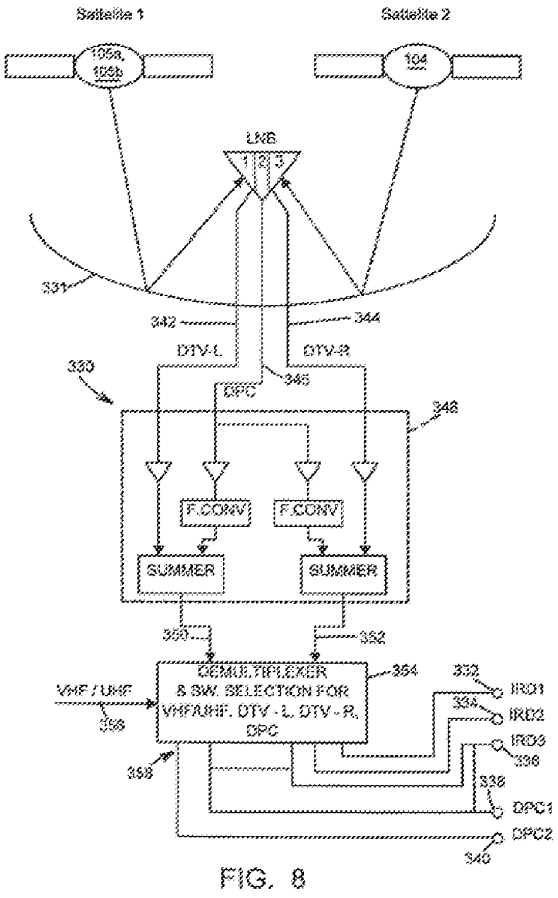
| Asserted Claims | Davis '730 |
|---|---|
| | converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers.<br><br>Davis '730 at 2:40–56:<br><br>According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver.<br><br>Davis '730 at 5:48–61:<br><br>Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each |

| Asserted Claims | Davis '730 |
|---|---|
| | of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308.<br><br>Davis '730 at 5:62–6:4:<br><br>Referring to FIG. 6, there is illustrated the details of the combiner 306. Input line 302 containing the DTV, either left-hand or right-hand polarized signals is coupled to a buffer amplifier 316 and then supplied to a summer 318. Input line 304 containing the DPC frequency band also at 950-1450 MHz is coupled to a buffer amplifier 320 and thereafter coupled to a frequency converter 322 for upconverting the 95014 1450 MHz band to a band between about 1550-2050 MHz.<br><br>Davis '730 at 6:5–14:<br><br>Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner.<br><br>Davis '730 at 6:33–50:<br><br>The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC |

| Asserted Claims | Davis '730 |
|---|---|
| | horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b) shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing.<br><br>Davis '730 at Fig. 4: |

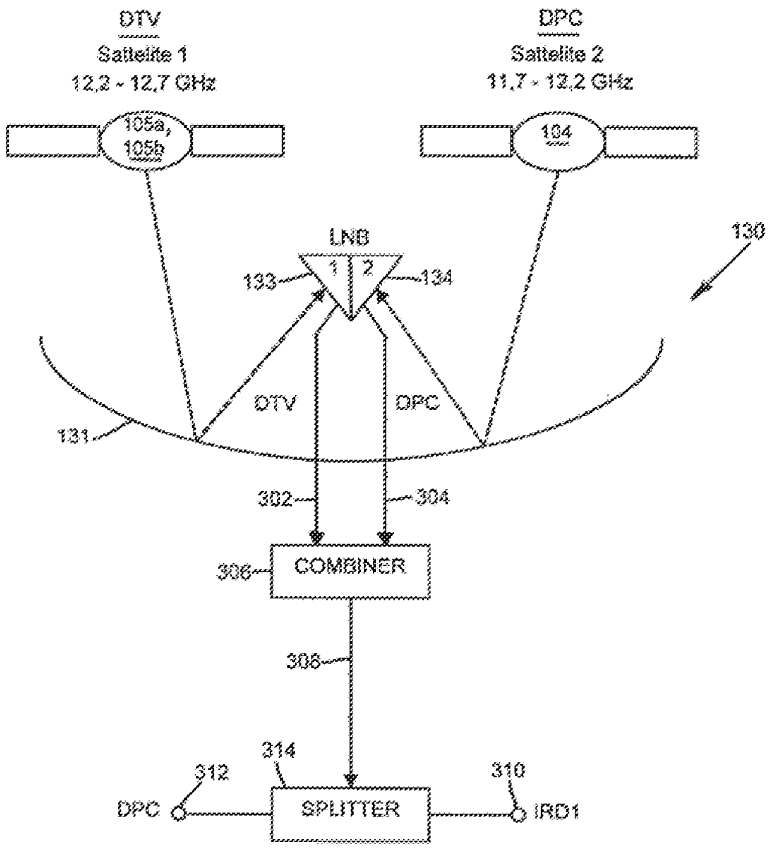
| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 4<br>Davis '730 at Fig. 6: |

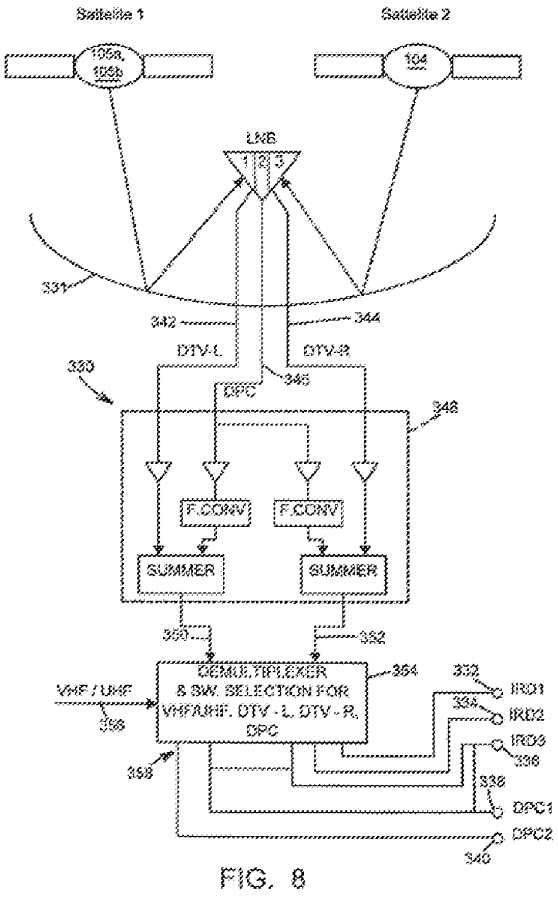
| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 6<br>Davis '730 at Fig. 8: |

| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 8<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one |

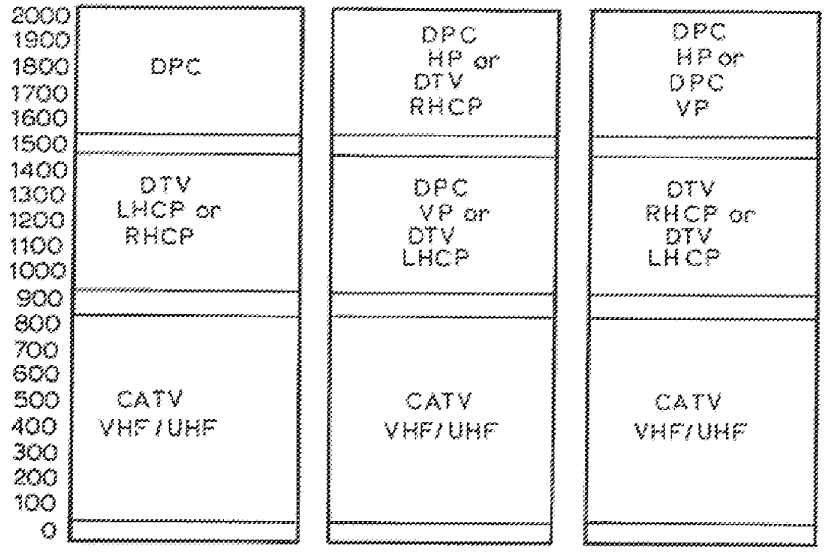
| Asserted Claims | Davis '730 |
|---|---|
| | or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Davis '730 discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Davis '730 at Abstract:<br><br>A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver.<br><br>Davis '730 at 5:48–61:<br><br>Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input |

| Asserted Claims | Davis '730 |
|---|---|
| | signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308.<br><br>Davis '730 at 6:51–68:<br><br>A demultiplexer 354 includes respective inputs for receiving output lines 350 and 352, and also an input line 356 containing VHF/UHF broadcast signals. Demultiplexer 354 includes output lines 358 each of which can supply any of the signals from input lines 350, 352 and 356 for coupling to the respective terminals 332, 334 . . . 340. For instance, the IRD 1 unit coupled to terminal 332 has access to all of the signals received from both of the separate satellites 105 a, 105 b as well as from satellite 104. Coupling of the selected signals is accomplished automatically in a well-known manner, such as by using voltage biased levels supplied from IRD 1 to a switch selector in the multiplexer 354 to accomplish the selection of the particular signal desired. This switch selection may be accomplished in a manner similar to that previously described with respect to existing LNBs. Demultiplexer 354 is a standard commercially available unit, such as Channelmaster model 6314IFD, or similar available units such as.<br><br>Davis '730 at Fig. 4: |

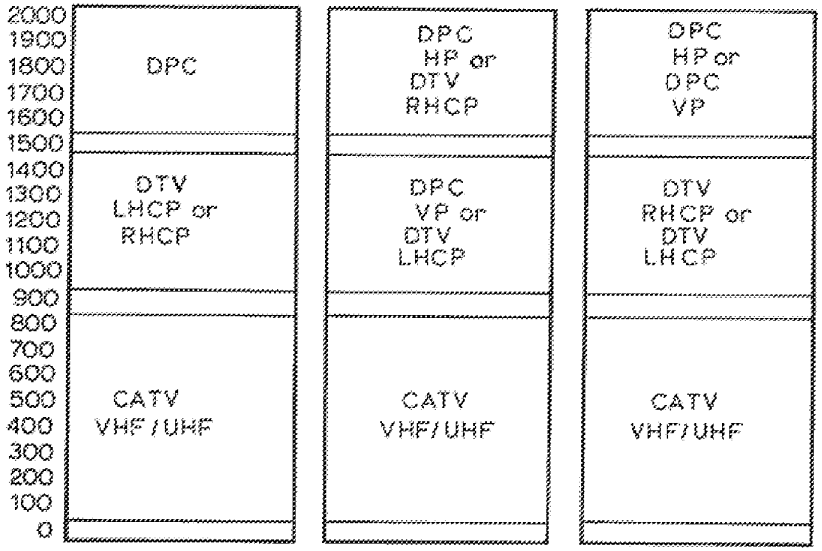
| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 4<br>Davis '730 at Fig. 8: |

| Asserted Claims | Davis '730 |
|---|---|
| |  <br>FIG. 8<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one |

| Asserted Claims | Davis '730 |
|---|---|
| | or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Davis '730 discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>*See, e.g.*:<br><br>Davis '730 at 6:5–14:<br><br>Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner.<br><br>Davis '730 at 6:33–50:<br><br>The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC |

| Asserted Claims | Davis '730 |
|---|---|
| | horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b) shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing.<br><br>Davis '730 at Fig. 7:<br><br>  <br><br>FIG. 7A FIG. 7B FIG. 7C<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Davis '730 |
|---|---|
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Davis '730 discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Davis '730 at 6:5–14:<br><br>Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner.<br><br>Davis '730 at 6:33–50:<br><br>The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b) |

| Asserted Claims | Davis '730 |
|---|---|
| | shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing.<br><br>Davis '730 at Fig. 7:<br>  <br><br>FIG. 7A FIG. 7B FIG. 7C<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Davis '730 |
|---|---|
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Davis '730 discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Davis '730 at 6:5–14:<br><br>Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner.<br><br>Davis '730 at 6:33–50:<br><br>The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b) |

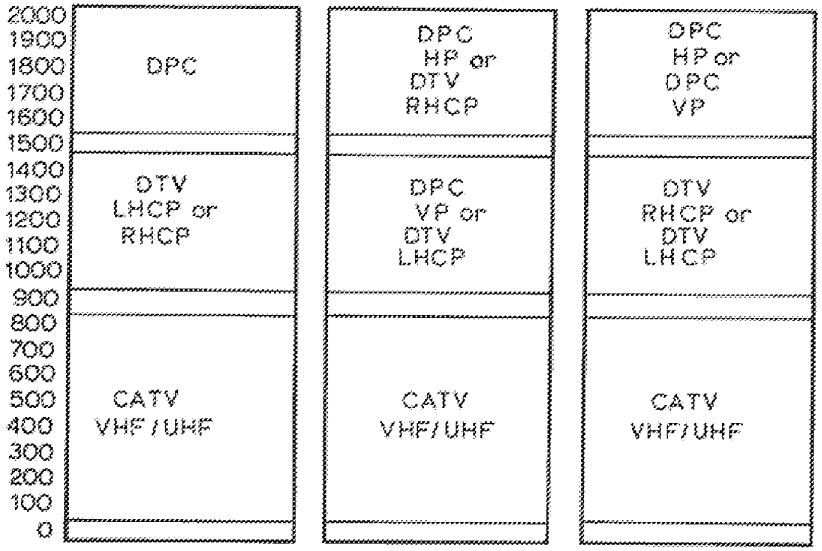
| Asserted Claims | Davis '730 |
|---|---|
| | shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing.<br><br>Davis '730 at Fig. 7:<br>  <br><br>FIG. 7A FIG. 7B FIG. 7C<br><br>To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

**Exhibit B5 – Fisk Invalidity Claim Chart**

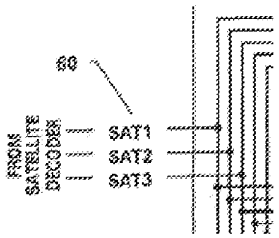
## INVALIDITY CLAIM CHART[1]
### Invalidity of U.S. Patent No. 7,542,715 in view of Fisk

International Publication No. WO 02/065771 A1 ("Fisk") has an international filing date of February 9, 2001, and was published on August 22, 2002. Fisk was published in the English language and designates the United States. Fisk therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(e). For the reasons listed below, Fisk invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Fisk |
|---|---|
| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Fisk discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Fisk at 10:23-11:5: |

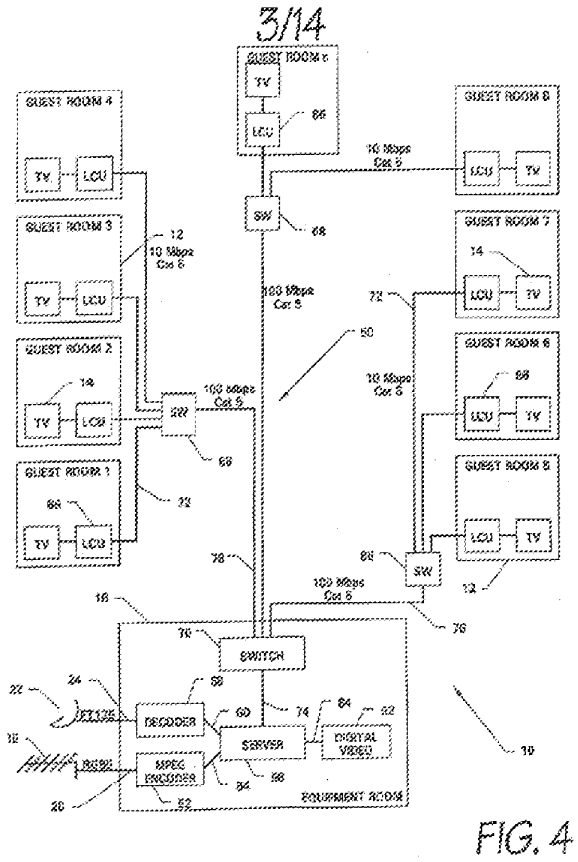
[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Fisk |
|---|---|
| | Additionally or alternatively, the receiving means may include a satellite dish for receiving scrambled and multiplexed satellite analogue television signals for a plurality of programmes, and means for descrambling and demultiplexing the signal for at least one of the programmes (for example a processor). However, since many satellite distributors use proprietary software and hardware (their "set top box") to ensure that programmes are only received by registered subscribers, the receiving means may alternatively or additionally include a satellite receiver, for instance a satellite dish, for receiving scrambled and multiplexed satellite analogue television signals for a plurality of programmes, means for descrambling and demultiplexing the signal for at least one of the programmes to produce an intermediate signal, means for modulating an RF signal with the intermediate signal, and means for demodulating the modulated RF signal. The descrambling, demultiplexing and modulating may therefore be provided by a conventional set top box.<br><br>Fisk at 41:7-24:<br><br>Referring also to FIGS. 19 to 23, the server may include the following components: television and radio cards 180,182,184,188 that receive analogue RF and satellite signals and convert them to digital signals in MPEG-2 format, television and radio cards 190 that receive digital signals in MPEG-2 format; playout cards 186 that multicast an MPEG-2 or MP3 file over the hotel network; and the software for the server 56, e.g. the channel manager 178, streaming components, etc. The server 56 may, for example, be presented as an 8 unit rack for mounting in a "19 inch" cabinet. Inside the cabinet there are a motherboard (e.g. Intel 700 MHz processor, 256 MB RAM, and 18 GB disk), a PCI bus 191 with 24 slots for the media cards, a 100 Mbps network card 238, power supply and fan. The server uses a DHCP client to request IP addresses for each card installed, and an SNMP client that will report any change in the status of the cards to an SNMP server in the channel controller. Each media card 180-190 installed in the server 56 is connected to the IGMP switch 70 by a Category 5 fly lead 193 from the RJ45 port 192 on the card to a port on the Switch 70. If more than one server 56 is provided, each server 56 is connected to a hub, so they can communicate with other devices on the network. As already described, the switch 70 is connected to the network 38,50 via its up-link port. The switch supports IGMP |

| Asserted Claims | Fisk |
|---|---|
| | and runs at 100 Mbps. The number of ports on the switch 70 and the number of Switches will depend on each installation.<br><br>Fisk at FIG. 6:<br>  <br><br><br>To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Fisk discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Fisk at Abstract:<br><br>A system for distributing television/video signals to different locations comprises a server capable of providing digital television/video signals for a plurality of programmes, a plurality of receivers each at a respective one of said locations, and a network connecting the server to the receivers, each receiver being operable to select a required one of the programmes and to communicate the selection to the 9 server, the server being responsive to such a selection to transmit the digital television/video signal for the selected programme over the network addressed to the receiver that selected that programme, and |

| Asserted Claims | Fisk |
|---|---|
| | each receiver being responsive to the digital television/video signal that is addressed to that receiver So that point-to-point communication is established from the server to that receiver.<br><br>Fisk at 4:1-11:<br><br>Another aspect of the invention provides a receiver for use in a system for distributing television/video signals to different locations, the system comprising a server capable of providing digital television/video signals for a plurality of programmes, and the receiver comprising means for enabling connection to the server by means of a network (for example, a connector, for instance a telephone or coaxial connector), means for Selecting a required one of the programmes (for example a keypad), and means for com municating the selection to the server (for example, a transmitter), the receiver being responsive to a digital television/video signal that is transmitted by the server over the network and addressed to that receiver so that point-to-point communication is established from the server to the receiver, and receiver is tuned to a given channel.<br><br>Fisk at 4:20-27:<br><br>Another aspect of the invention provides a receiver for use in a system for distributing television/video signals to different locations, the system comprising a server capable of providing digital television/video signals for a plurality of programmes, the receiver comprising a connection to the server via a network, a selector for selecting a required one of the programmes, and a transmitter for communicating the selection to the server, the receiver being responsive to a digital television/video signal that is transmitted by the server over the network and addressed to that receiver so that point-to-point communication is established from the server to that receiver.<br><br>Fisk at 22:9-27:<br><br>In order to deal with these problems and disadvantages, the embodiment of the invention that will now be described with reference to FIG. 4 uses a switched point to-point digital |

| Asserted Claims | Fisk |
|---|---|
| | distribution network 50 employing an internet protocol (IP) and in particular the user datagram protocol (UDP/IP). In the equipment room 16, the downlead 20 from the terrestrial television aerial 18 feeds a receiver and MPEG encoder 52 which provides digital MPEG video streams 54 for the received terrestrial television programmes to a server 56 (although one server 56 has been shown in the drawing, several such servers may be employed). Also, the downlead 24 from the satellite dish 22 feeds a decoder/descrambler 58 which provides digital MPEG video streams 60 for the received satellite television programmes to the server 56. Furthermore, the video replay equipment 62 has a digital output and provides digital MPEG video streams 64 for the video programmes to the server 56. The server 56 selects which of the video streams is to be transmitted to which room 12, and places the selected video streams on the digital network 50 using UDP/IP, or TCP/IP, each addressed to the selected room 12. In each room 12, the television 14 is connected to the network 50 by a local control unit (LCU) 66 that receives the video stream addressed to that room 12, decodes it, and supplies the resulting analogue video and audio signals to the television 14. Each LCU 66 is also operable to send requests over the network 38 to the server 56, for example to change the television/video channel supplied to that LCU 66.<br><br>Fisk at Fig. 4: |

| Asserted Claims | Fisk |
|---|---|
| |  <br>FIG. 4<br><br>To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

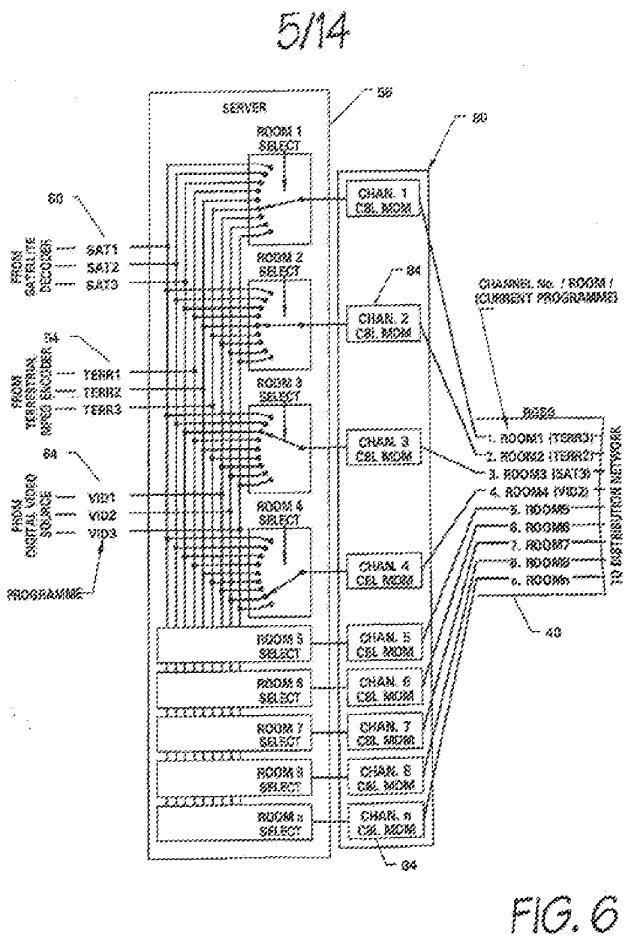
| Asserted Claims | Fisk |
|---|---|
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Fisk discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Fisk at Abstract:<br><br>A system for distributing television/video signals to different locations comprises a server capable of providing digital television/video signals for a plurality of programmes, a plurality of receivers each at a respective one of said locations, and a network connecting the server to the receivers, each receiver being operable to select a required one of the programmes and to communicate the selection to the 9 server, the server being responsive to such a selection to transmit the digital television/video signal for the selected programme over the network addressed to the receiver that selected that programme, and each receiver being responsive to the digital television/video signal that is addressed to that receiver So that point-to-point communication is established from the server to that receiver.<br><br>Fisk at 4:1-11:<br><br>Another aspect of the invention provides a receiver for use in a system for distributing television/video signals to different locations, the system comprising a server capable of providing digital television/video signals for a plurality of programmes, and the receiver comprising means for enabling connection to the server by means of a network (for example, a connector, for instance a telephone or coaxial connector), means for Selecting a required one of the programmes (for example a keypad), and means for com municating the selection to the server (for example, a transmitter), the receiver being responsive to a digital television/video signal that is transmitted by the server over the network and |

| Asserted Claims | Fisk |
|---|---|
| | addressed to that receiver so that point-to-point communication is established from the server to the receiver, and receiver is tuned to a given channel.<br><br>Fisk at 10:23-11:5:<br><br>Additionally or alternatively, the receiving means may include a satellite dish for receiving scrambled and multiplexed satellite analogue television signals for a plurality of programmes, and means for descrambling and demultiplexing the signal for at least one of the programmes (for example a processor). However, since many satellite distributors use proprietary software and hardware (their "set top box") to ensure that programmes are only received by registered subscribers, the receiving means may alternatively or additionally include a satellite receiver, for instance a satellite dish, for receiving scrambled and multiplexed satellite analogue television signals for a plurality of programmes, means for descrambling and demultiplexing the signal for at least one of the programmes to produce an intermediate signal, means for modulating an RF signal with the intermediate signal, and means for demodulating the modulated RF signal. The descrambling, demultiplexing and modulating may therefore be provided by a conventional set top box.<br><br>Fisk at 13:29-14:5:<br><br>The invention further provides a range of circuit boards for controlling a television set, each circuit board of the range comprising means for connection to a generic circuit board, each circuit board of the range comprising means (for example, a receiver) for receiving a generic control signal, based on control instructions received from a network and/or from a user interface, from the generic circuit board, and means (for example a processor) for converting the generic control signal into a specific control signal having a different format than the generic control signal, and means (for example a transmitter) for supplying the specific control signals to a control interface of the television set so as to control the television set in accordance with the control instructions.<br><br>Fisk at 22:9-27: |

| Asserted Claims | Fisk |
|---|---|
| | In order to deal with these problems and disadvantages, the embodiment of the invention that will now be described with reference to FIG. 4 uses a switched point to-point digital distribution network 50 employing an internet protocol (IP) and in particular the user datagram protocol (UDP/IP). In the equipment room 16, the downlead 20 from the terrestrial television aerial 18 feeds a receiver and MPEG encoder 52 which provides digital MPEG video streams 54 for the received terrestrial television programmes to a server 56 (although one server 56 has been shown in the drawing, several such servers may be employed). Also, the downlead 24 from the satellite dish 22 feeds a decoder/descrambler 58 which provides digital MPEG video streams 60 for the received satellite television programmes to the server 56. Furthermore, the video replay equipment 62 has a digital output and provides digital MPEG video streams 64 for the video programmes to the server 56. The server 56 selects which of the video streams is to be transmitted to which room 12, and places the selected video streams on the digital network 50 using UDP/IP, or TCP/IP, each addressed to the selected room 12. In each room 12, the television 14 is connected to the network 50 by a local control unit (LCU) 66 that receives the video stream addressed to that room 12, decodes it, and supplies the resulting analogue video and audio signals to the television 14. Each LCU 66 is also operable to send requests over the network 38 to the server 56, for example to change the television/video channel supplied to that LCU 66.<br><br>Fisk at 40:10-19:<br><br>The server 56 comprises media capture, compression, and streaming functions and includes a media manager 174 that handles media-related events. The media manager 174 collects channel and schedule information from a configuration manager 176 and then passes messages to a specific channel manager 178. These messages detail actions that need to be taken; for example, loading an asset file, or streaming an asset on a particular card/channel. The configuration manager 176 holds a central repository of system wide information. This data is used to control many aspects of a particular installation. A subset of the configuration manager database holds information specific to the server 56. This identifies the various servers, the cards that are registered, the channels that have been assigned, the loaded media assets and the overall schedule. |

**Exhibit B5 – Fisk Invalidity Claim Chart**

| Asserted Claims | Fisk |
|---|---|
| | Fisk at Fig. 6: |

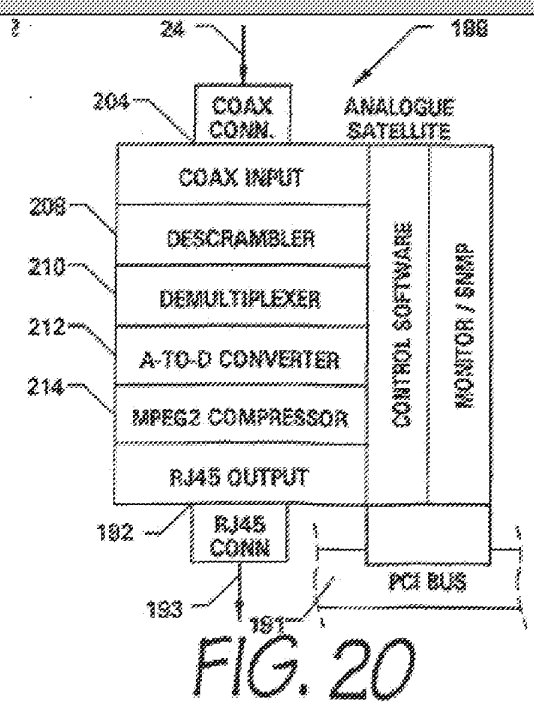
| Asserted Claims | Fisk |
|---|---|
| |  <br>FIG. 6<br><br>Fisk at 40:27-41:11: |

| Asserted Claims | Fisk |
|---|---|
| | The system supports the delivery of terrestrial television and radio, satellite television and pre-digitised media streams. Analogue streams, such as local television and radio channels, are captured and compressed prior to distribution. The delivery of analogue or digital television and radio requires efficient data capture and compression. This capability is available through hardware video and audio capture cards 180-184. These cards allow the capture of a variety of analogue and digital streams from television and radio, and the generation of digital streams in MPEG-2 format for video, or MP3 format for audio. However, these cards operate on one specific input channel, and so a single card is provided per channel. The MPEG-2 or MP3 stream that is generated by each card is routed directly to an address and port on the network.<br><br>Referring also to Figures 19 to 23, the server may include the following components: television and radio cards 180,182,184,188 that receive analogue RF and satellite signals and convert them to digital signals in MPEG-2 format; television and radio cards 190 that receive digital signals in MPEG-2 format; playout cards 186 that 10 multicast an MPEG-2 or MP3 file over the hotel network; and the software for the server 56, e.g. the channel manager 178, streaming components, etc.<br><br>Fisk at 42:6-43:12 & associated table:<br><br>Turning now to the processing that is performed to convert the analogue radio frequency signals on which satellite channels are delivered to the hotel via satellite dish 22 into digital streams in MPEG-2 format, ideally the analogue satellite card 188 (FIG. 20) should receive signals directly from the satellite dish, de-scramble these and then select the appropriate channel, and convert the output to an MPEG stream. However, most of the satellite distributors use proprietary software and hardware to ensure that pro grammes are only received by registered subscribers. As a result, a set-top box 202 is required to receive, decrypt and transmit the required channel as a RF signal. The actual satellite card then becomes identical to the terrestrial TV card 182 (FIG. 19). With this approach a set-top box 202 is required for each satellite channel that is to be distributed within the hotel. One card 180,188 will be installed in the server 56 per satellite channel that the hotel wants to receive. The server 56 uses a DHCP client to request IP addresses for each card 180,188 |

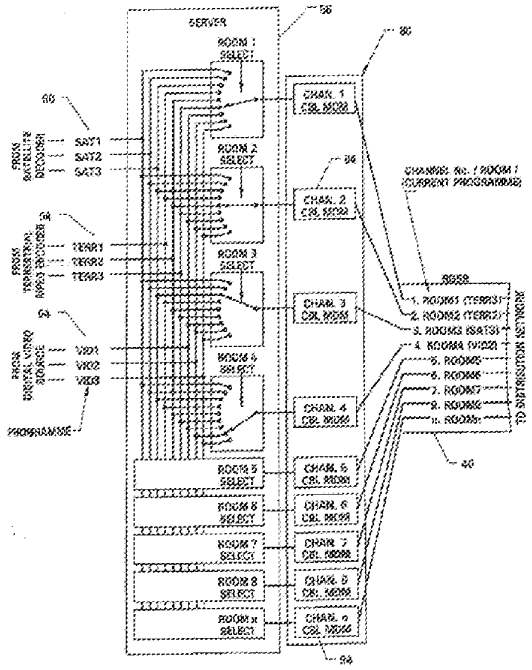
| Asserted Claims | Fisk |
|---|---|
| | installed. Each card 180,188 supports an SNMP client that reports any change in the status of the card to the SNMP server. The input port 194.204 of the first card is connected to the coaxial cable from the satellite dish. Additional cards can be added as required to the server 56. Where multiple cards are deployed a distribution amplifier is used to ensure that a consistent source signal strength is available to all cards. A hardware failure on one card will not affect the functioning of other cards. The listening frequency of the demodulator on each analogue satellite receiver card 180,188 will be under software control. The descrambling algorithms will also be under software control, if possible. The table below tracks the path of the stream sequentially through the analogue satellite receiver card 188, starting at the satellite dish 22 and terminating at the RJ45 output port 192 on the card 188. |

| Analogue Satellite Television Card 188 | | | |
|---|---|---|---|
| Component | Path of Signal | Format | Notes |
| Satellite Receiver System | Satellite dish 22 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| | Coaxial cable 24 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| Satellite Receiver Card | Coaxial input port 204 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| | Descrambler 208 | Analogue, Multiplexed, Uncompressed | |
| | Demultiplexer 210 | Analogue, Uncompressed | The selected channel is under software control |
| | Analogue to digital converter 212 | Digital, Uncompressed | |
| | MPEG-2 Compressor 214 | Digital, MPEG-2 | |
| | RJ45 output port 192 | Digital, MPEG-2 | An IP address is assigned to the port by a DHCP client on the server 56 |

Fisk at Fig. 20:

| Asserted Claims | Fisk |
|---|---|
| |  <br>FIG. 20<br><br>Fisk at 44:10-15 & associated table on p. 45:<br><br>In the case of the reception of digital satellite television, a card 190 (FIG.22) may be employed having a descrambler 230 and demultiplexer 232. The table below tracks the path of the stream sequentially through the digital satellite television card 190, starting at the satellite dish 22 and terminating at the RJ45 output port 192 on the card 190.<br><br>To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art |

| Asserted Claims | Fisk |
|---|---|
| | references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Fisk discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Fisk at Fig. 6: |

| Asserted Claims | Fisk |
|---|---|
| | 5/14<br>  <br>FIG. 6<br><br>Fisk at 42:6-43:12 & associated table:<br><br>Turning now to the processing that is performed to convert the analogue radio frequency signals on which satellite channels are delivered to the hotel via satellite dish 22 into digital streams in MPEG-2 format, ideally the analogue satellite card 188 (FIG. 20) should receive signals directly from the satellite dish, de-scramble these and then select the appropriate channel, and convert the output to an MPEG stream. However, most of the |

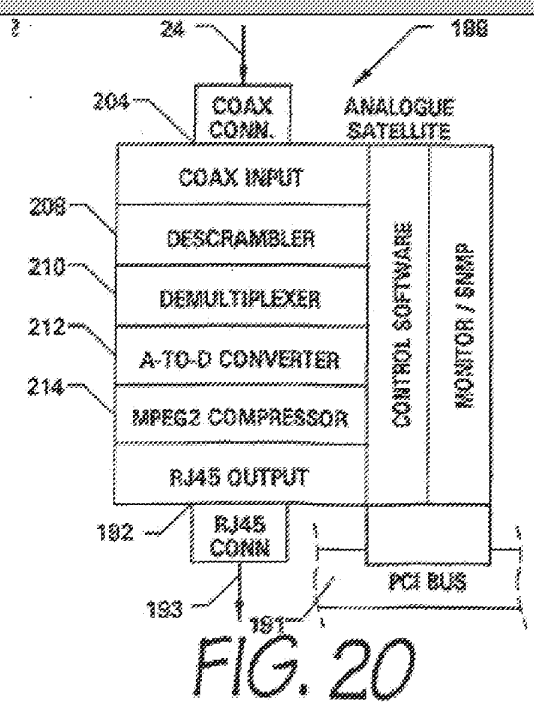
| Asserted Claims | Fisk |
|---|---|
| | satellite distributors use proprietary software and hardware to ensure that pro grammes are only received by registered subscribers. As a result, a set-top box 202 is required to receive, decrypt and transmit the required channel as a RF signal. The actual satellite card then becomes identical to the terrestrial TV card 182 (FIG. 19). With this approach a set-top box 202 is required for each satellite channel that is to be distributed within the hotel.<br><br>One card 180,188 will be installed in the server 56 per satellite channel that the hotel wants to receive. The server 56 uses a DHCP client to request IP addresses for each card 180,188 installed. Each card 180,188 supports an SNMP client that reports any change in the status of the card to the SNMP server. The input port 194.204 of the first card is connected to the coaxial cable from the satellite dish. Additional cards can be added as required to the server 56. Where multiple cards are deployed a distribution amplifier is used to ensure that a consistent source signal strength is available to all cards. A hardware failure on one card will not affect the functioning of other cards. The listening frequency of the demodulator on each analogue satellite receiver card 180,188 will be under software control. The descrambling algorithms will also be under software control, if possible. The table below tracks the path of the stream sequentially through the analogue satellite receiver card 188, starting at the satellite dish 22 and terminating at the RJ45 output port 192 on the card 188. |

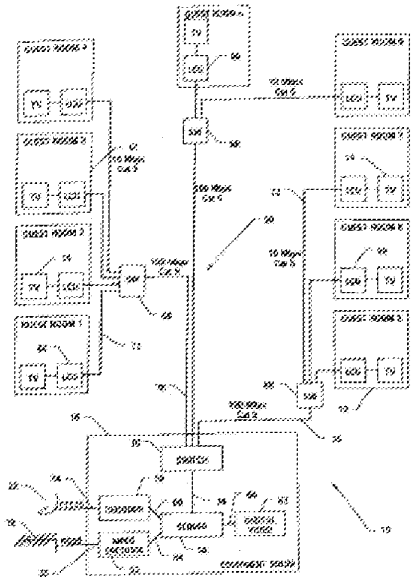
| Asserted Claims | Fisk |
|---|---|

Analogue Satellite Television Card 188

| Component | Path of Signal | Format | Notes |
|---|---|---|---|
| Satellite Receiver System | Satellite dish 22 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| | Coaxial cable 24 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| Satellite Receiver Card | Coaxial input port 204 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| | Descrambler 208 | Analogue, Multiplexed, Uncompressed | |
| | Demultiplexer 210 | Analogue, Uncompressed | The selected channel is under software control |
| | Analogue to digital converter 212 | Digital, Uncompressed | |
| | MPEG-2 Compressor 214 | Digital, MPEG-2 | |
| | RJ45 output port 192 | Digital, MPEG-2 | An IP address is assigned to the port by a DHCP client on the server 56 |

Fisk at Fig. 20:

| Asserted Claims | Fisk |
|---|---|
| |  <br>FIG. 20<br><br>Fisk at 44:10-15 & associated table on p. 45:<br><br>In the case of the reception of digital satellite television, a card 190 (FIG.22) may be employed having a descrambler 230 and demultiplexer 232. The table below tracks the path of the stream sequentially through the digital satellite television card 190, starting at the satellite dish 22 and terminating at the RJ45 output port 192 on the card 190.<br><br>To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art |

| Asserted Claims | Fisk |
|---|---|
| | references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Fisk discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Fisk at Fig. 4:<br>  <br>FIG. 4<br><br>Fisk at 24:2-8: |

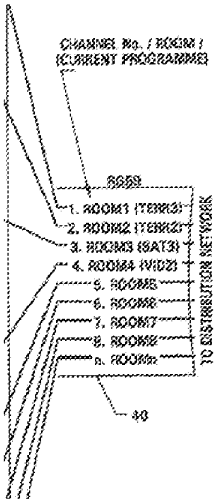
| Asserted Claims | Fisk |
|---|---|
| | The losses over a 75 Q RG59 television coaxial cable are typically 0.13 dB/mat 100 MHz, 0.19 dB/m at 200 MHz and 0.46 dB/m at 100 GHz. Such coaxial cable can be used without modification to carry digitally encoded MPEG video. Using digital encoding, each analogue channel is transformed to a "data pipe" with over 30Mbps of capacity. This pipe is used to carry a multiplex of video channels. The number of video channels that can be carried depends on the picture quality required. For received PAL TV picture quality, typically six video channels can be carried in each pipe.<br><br>Fisk at Fig. 6:<br><br>  <br><br>Fisk at 39:29-4-9:<br><br>The server 56 will now be described in more detail, also with reference to FIG. 8. The server 56 controls the collation and distribution of stream-based media services within a hotel environment. The server 56 provides a number of classes of media content, such as terrestrial television channels, terrestrial radio channels, digital satellite television channels, and pre-digitised media assets (movies). |

**Exhibit B5 – Fisk Invalidity Claim Chart**

| Asserted Claims | Fisk |
|---|---|
| | The server 56 processes these input streams in a variety of formats (analogue, digital, compressed, encrypted, etc.) and outputs digital streams in MPEG-2 format to the switch 70 that supports Internet Group Management Protocol (IGMP). A channel controller uses IGMP to allow LCUs 66 to subscribe to any of the shared stream-based media services. The UDP/IP transport protocol is used for transmitting MPEG-2 streams to the LCU 66.\ Fisk at Tables on p. 43 & 45: |

| Asserted Claims | Fisk |
|---|---|

Analogue Satellite Television Card 188

| Component | Path of Signal | Format | Notes |
|---|---|---|---|
| Satellite Receiver System | Satellite dish 22 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| | Coaxial cable 24 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| Satellite Receiver Card | Coaxial input port 204 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| | Descrambler 208 | Analogue, Multiplexed, Uncompressed | |
| | Demultiplexer 210 | Analogue, Uncompressed | The selected channel is under software control |
| | Analogue to digital converter 212 | Digital, Uncompressed | |
| | MPEG-2 Compressor 214 | Digital, MPEG-2 | |
| | RJ45 output port 192 | Digital, MPEG-2 | An IP address is assigned to the port by a DHCP client on the server 56 |

Analogue Satellite Television Card 188

| Component | Path of Signal | Format | Notes |
|---|---|---|---|
| Satellite Receiver System | Satellite dish 22 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| | Coaxial cable 24 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| Satellite Receiver Card | Coaxial input port 204 | Analogue, Scrambled, Multiplexed, Uncompressed | |
| | Descrambler 208 | Analogue, Multiplexed, Uncompressed | |
| | Demultiplexer 210 | Analogue, Uncompressed | The selected channel is under software control |
| | Analogue to digital converter 212 | Digital, Uncompressed | |
| | MPEG-2 Compressor 214 | Digital, MPEG-2 | |
| | RJ45 output port 192 | Digital, MPEG-2 | An IP address is assigned to the port by a DHCP client on the server 56 |

To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto.

| Asserted Claims | Fisk |
|---|---|
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Fisk discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Fisk at 2:13-24:<br><br>One aspect of the invention provides a system for distributing television/video signals to different locations (such as different rooms in a hotel, or different dwellings in a neighbourhood), the system comprising a server capable of providing digital television/video signals for a plurality of programmes, a plurality of receivers each at a respective one of said locations, and a network connecting the server to the receivers, each receiver being operable to select a required one of the programmes and to communicate the selection to the server, the server being responsive to such a selection to transmit the digital television/video signal for the selected programme over the network addressed to the receiver that selected that programme, and each receiver being responsive to the digital television/video signal that is addressed to that receiver so that point-to-point communication is established from the server to that receiver.<br><br>Fisk at 6:7-21:<br><br>A further aspect of the invention provides a corresponding method of distributing television/video signals to different locations, the method comprising providing a server capable of providing digital television/video signals for a plurality of programmes, providing a plurality of receivers each at a respective one of said locations, providing a network connecting the server to the receivers, each receiver selecting a required one of the programmes and communicating the selection to the server, the server responding to such a selection and transmitting the digital television/video signal for the selected programme |

| Asserted Claims | Fisk |
|---|---|
| | over the network addressed to the receiver that selected that programme, and each receiver responding to the digital television/video signal that is addressed to that receiver so that point-to-point communication is established from the server to that receiver. Preferably, the transmitting includes transmitting the digital television/video signal over telephone-grade twisted-pair cable and/or transmitting the digital television/video signal over coaxial cable on a channel allocated according to the receiver to which the signal is being sent, and each receiver being tuned to its respective channel.<br><br>Fisk at 22:9-23:1:<br><br>In order to deal with these problems and disadvantages, the embodiment of the invention that will now be described with reference to FIG. 4 uses a switched point to-point digital distribution network 50 employing an internet protocol (IP) and in particular the user datagram protocol (UDP/IP). In the equipment room 16, the downlead 20 from the terrestrial television aerial 18 feeds a receiver and MPEG encoder 52 which provides digital MPEG video streams 54 for the received terrestrial television programmes to a server 56 (although one server 56 has been shown in the drawing, several such servers may be employed). Also, the downlead 24 from the satellite dish 22 feeds a decoder/descrambler 58 which provides digital MPEG video streams 60 for the received satellite television programmes to the server 56. Furthermore, the video replay equipment 62 has a digital output and provides digital MPEG video streams 64 for the video programmes to the server 56. The server 56 selects which of the video streams is to be transmitted to which room 12, and places the selected video streams on the digital network 50 using UDP/IP, or TCP/IP, each addressed to the selected room 12. In each room 12, the television 14 is connected to the network 50 by a local control unit (LCU) 66 that receives the video stream addressed to that room 12, decodes it, and supplies the resulting analogue video and audio signals to the television 14. Each LCU 66 is also operable to send requests over the network 38 to the server 56, for example to change the television/video channel supplied to that LCU 66.<br><br>The network 50 is designed to support a bandwidth of up to 10 Mbps for communication between the server 56 and each LCU 66. The components required to deliver this |

| Asserted Claims | Fisk |
|---|---|
| | bandwidth will vary because of the different topology of each hotel—for example, the layout of floors, risers, and the location of the equipment room 16 in which the server(s) 56 is/are situated.<br><br>Fisk at 24:15-27:<br><br>Digital video over coax generally uses a 64QAM modulation scheme, where groups of 6 bits are mapped to a carrier state. Each carrier state has a unique amplitude/ carrier phase position as illustrated in FIG. 8.<br><br>In order to decode 64QAM with an acceptable worst case error rate, before error correction, of 1 error in 10 bits, a signal-to-noise ratio per bit of greater than 18 dB is needed. At a smaller signal-to-noise ratio each dot in the constellation will become blurred and it will not be possible to differentiate one dot from another. A 1.5 dB difference in signal-to-noise level will make an order of magnitude difference in the error rate.<br><br>Higher order QAM schemes can be used to increase the data capacity of each channel. The increased capacity is gained at the price of needing a higher signal to-noise ratio to properly decode the signal. Conversely, lower order schemes are more rugged but have a lower capacity.<br><br>Fisk at Fig. 8: |

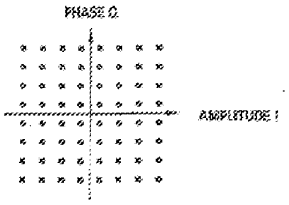
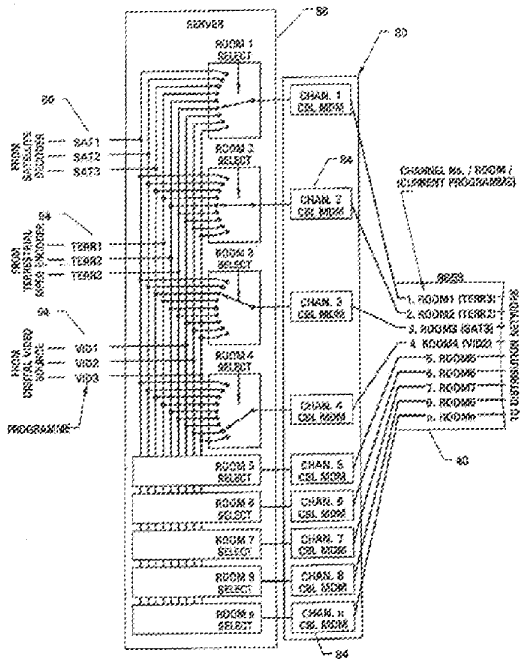
| Asserted Claims | Fisk |
|---|---|
| |  <br>FIG. 8<br><br>Fisk at 28:4-19:<br><br>The repartitioning of the channels on the coaxial cabling 40 is achieved by installing a cable modem termination system 80 between the server 56 and the coaxial cable network 38, and a cable modem 82 in each LCU 66. As shown in FIG. 6, the cable modem termination system 80 can be considered to comprise a cable modem 84 for each channel, and the server 56 can be considered to be able to connect each cable modem 84 selectably to any of the incoming video streams. Each cable modem 84 then transmits that video stream on a preset channel on the coaxial cable 40. As shown in FIG. 7, the cable modem 82 in each LCU 66 is preset to a particular channel, i.e. the channel for the room 12 in which the LCU 66 is situated. Each channel carried in the coaxial cable 40 can thus be dedicated to a single LCU 66. The server 56 will only transmit the service requested by the LCU 66. This is a simple architecture to install, as few cabling changes have to be made between the server 56 and room 12, and no cabling changes need to be made in the room 12. However, depending on the number of rooms served by each spur of the coaxial cable network 38, it may be necessary to modify the configuration of the coaxial cables at each riser to ensure that each spur has enough channels to support the number of rooms it is intended to serve.<br><br>Fisk at 40:4-9: |

**Exhibit B5 – Fisk Invalidity Claim Chart**

| Asserted Claims | Fisk |
|---|---|
| | The server 56 processes these input streams in a variety of formats (analogue, digital, compressed, encrypted, etc.) and outputs digital streams in MPEG-2 format to the switch 70 that supports Internet Group Management Protocol (IGMP). A channel controller uses IGMP to allow LCUs 66 to subscribe to any of the shared stream-based media services. The UDP/IP transport protocol is used for transmitting MPEG-2 streams to the LCU 66.<br><br>Fisk at Fig. 6: |

| Asserted Claims | Fisk |
|---|---|
| | 5/14<br>  <br>FIG. 6<br><br>Fisk at 41:7-24:<br><br>Referring also to FIGS. 19 to 23, the server may include the following components: television and radio cards 180,182,184,188 that receive analogue RF and satellite signals and convert them to digital signals in MPEG-2 format, television and radio cards 190 that receive digital signals in MPEG-2 format; playout cards 186 that multicast an MPEG-2 or MP3 file over the hotel network; and the software for the server 56, e.g. the channel |

| Asserted Claims | Fisk |
|---|---|
| | manager 178, streaming components, etc. The server 56 may, for example, be presented as an 8 unit rack for mounting in a "19 inch" cabinet. Inside the cabinet there are a motherboard (e.g. Intel 700 MHz processor, 256 MB RAM, and 18 GB disk), a PCI bus 191 with 24 slots for the media cards, a 100 Mbps network card 238, power supply and fan. The server uses a DHCP client to request IP addresses for each card installed, and an SNMP client that will report any change in the status of the cards to an SNMP server in the channel controller. Each media card 180-190 installed in the server 56 is connected to the IGMP switch 70 by a Category 5 fly lead 193 from the RJ45 port 192 on the card to a port on the Switch 70. If more than one server 56 is provided, each server 56 is connected to a hub, so they can communicate with other devices on the network. As already described, the switch 70 is connected to the network 38,50 via its up-link port. The switch supports IGMP and runs at 100 Mbps. The number of ports on the switch 70 and the number of Switches will depend on each installation.<br><br>To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Fisk discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Fisk |
|---|---|
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Fisk discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Fisk at 40:10-19:<br><br>The server 56 comprises media capture, compression, and streaming functions and includes a media manager 174 that handles media-related events. The media manager 174 collects channel and Schedule information from a configuration manager 176 and then passes messages to a specific channel manager 178. These messages detail actions that need to be taken; for example, loading an asset file, or streaming an asset on a particular card/channel. The configuration manager 176 holds a central repository of system wide information. This data is used to control many aspects of a particular installation. A subset of the configuration manager database holds information specific to the server 56. This identifies the various servers, the cards that are registered, the channels that have been assigned, the loaded media assets and the overall schedule.<br>To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is | Fisk discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. |

| Asserted Claims | Fisk |
|---|---|
| communicated to devices in the network. | *See* claim 10, *supra*.<br><br>To the extent Fisk does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Fisk alone or it would have been obvious to combine Fisk with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

**Exhibit B6 – Gregoire Invalidity Claim Chart**

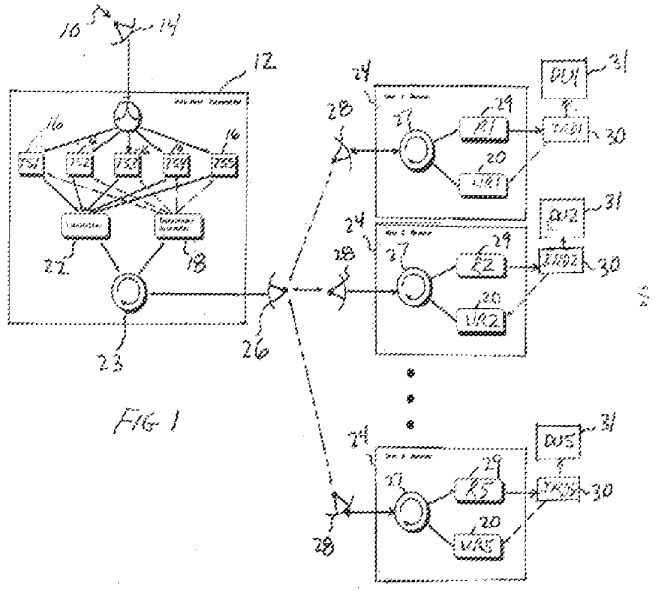
## INVALIDITY CLAIM CHART[1]
### Invalidity of U.S. Patent No. 7,542,715 in view of Gregoire

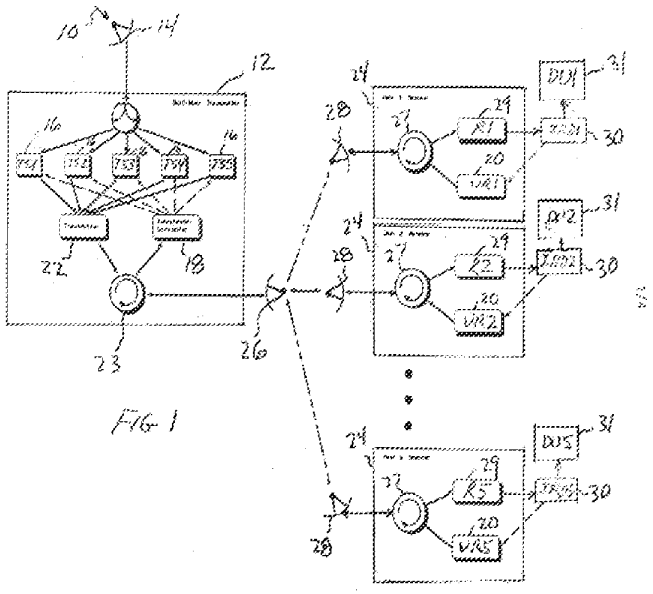
International Patent Publication No. WO 00/67401 ("Gregoire") was filed as PCT No. US00/12401 on May 4, 2000 and published on November 9, 2000. Gregoire claims priority to U.S. Patent Application No. 09/305,895, which was filed on May 5, 1999. Gregoire therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Gregoire invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Gregoire |
|---|---|
| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Gregoire discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.:*<br><br>Gregoire at Abstract: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Gregoire |
|---|---|
| | A method and system for wireless Direct To Home satellite services signal distribution to a plurality of service requesting users. A multi-user transmitter is coupled to an earth satellite antenna to receive selectable satellite transponder signals. The multi-user transmitter includes a plurality of transponder selectors, each transponder selector preferably being associated with or even dedicated to a respective service-requesting user is provided with a user-controllable channel selector for accessing the selectable satellite transponder signals. The user-controllable channel selector is coupled to a respective user display unit and to a respective user receiver unit. A responder, which may be in the user receiver unit, is responsive to a service-requesting user-selected channel signal for transmitting a transponder selection signal to the multi-user transmitter. The transponder selection signal contains information indicative of a desired satellite transponder signal, to be transmitted to the service-requesting user associated with the respective (typically user-selected) channel signal. The multi-user transmitter transmits the selected satellite transponder signals to each of the plurality of service requesting users in response to the transponder selection signals, and may do so by broadcasting. The desired satellite transponder signal is then coupled to the service-requesting user receiver (which may contain the user-controllable channel selector) for display by the respective user display unit.<br><br>Gregoire at 3:20-4:8:<br><br>SUMMARY OF THE INVENTION<br><br>In accordance with the present invention, an enhanced method and system is provided for wireless Direct To Home satellite services signal distribution to a plurality of service requesting users. Each user controls an IRD associated with a user display receiver, such as a television set. When the user switches channels on his IRD, a control processor senses the channel change. The processor uses this information to set control signals that are sent back on a wireless connection to a multiple-user transmitter unit that is connected to an earth station (satellite dish) antenna. The multi-user transmitter processes the control signals and sends them to a user's (preferably dedicated) transponder selector, which filters out a single transponder signal for transmission to the user. Several transponder signals are |

| Asserted Claims | Gregoire |
|---|---|
| | sent forward, one for each of the users. A typical implementation of the invention would have five to ten users and the local wireless channel would accommodate a comparable number of transponders. Each user has a receiver at his location that filters the broadcast signal from the transponder signal that he requested. A much smaller bandwidth results than that which would be required to transmit signals from all 32 transponders to each user.<br><br>Gregoire at Fig. 1:<br><br>  <br>FIG 1<br><br>To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Gregoire |
|---|---|
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Gregoire discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Gregoire at Fig. 1:<br><br>  <br><br>Gregoire at 7:1-5:<br><br>Transponder controller 18 is controlled by control signals from user responder units, one for each user at the user location, that determine which transponder the user wants to access. The user responder units operation is described in more 5 detail hereinafter. |

| Asserted Claims | Gregoire |
|---|---|
| | Gregoire at 7:6-24:<br><br>Transmitter 22 bundles the transponders at the intermediate frequency band and upconverts them to a higher frequency for broadcast to the users. Circulator 23 is coupled between transmitter 22 and transponder controller 18 and transmitter/controller antenna 26. Each user has a receiver unit 24 that picks up the broadcast signal from transmitter / controller antenna 26 by user antenna 28 and through circulator 27 and receiver 29, one respectively for each user, namely Rl, R2 … RS, downconverts it and filters out the transponder signal intended for him. Each receiver 29 is coupled to an IRD 30, one for each user, namely IRD I, IRD2 15 … IRD5 which, in turn, are connected to respective display units 31, which can be television or workstation monitors, namely DUI, DU2 … DUS. Each receiver unit 24 also has user responder 20, namely URI, UR2 … URS, coupled to its respective IRD. Each user responder 20 queries its respective IRD 30 to determine the transponder requested by the user- and encodes that information for 20 transmission back to the transponder selectors in MUT 12. The control data occupies a small band adjacent to the users' transponders in the communication channel. MUT 12 has to distinguish among the control signals from the various users and direct them to the proper transponder selectors. It does this using conventional or other multiple access techniques.<br><br>Gregoire at 12:1-17:<br><br>1. The transmitter<br><br>Transmitter 22 bundles via multi-user combiner 43 (e.g., Narda four-way combiner Model No. 431 lC-4) all of the selector signals into a reduced bandwidth package at the intermediate frequencies. It then upconverts them to the U-NII band, bandpass filters and amplifies the signal for transmission, using frequency converter 45 which includes up-converter/ mixer 46 (e.g., Mini-Circuits Laboratories Model ZMX-7GLHR) coupled to local oscillator 48 (e.g., Luff Research Model No. SLSM2-38004300), bandpass filter 47 (e.g., K & L Microwave Model No. 51B32-5275/f400), amplifier 49 (e.g., JCA Technology Model No. JCA048-F01), circulator 23 (e.g., Narda three port circulator Model No. 4914) and transmitter/ controller antenna 26 . In an example depicted in Fig. 4, |

| Asserted Claims | Gregoire |
|---|---|
| | three user selected transponder signals are packaged into the U-NII band at 5150 - 5350 MHz. This is considerably smaller than the 1000 MHz necessary to transmit all the DTH transponders. Transmitter/ controller antenna 26 can be a U-NII antenna, which is a small 3" x 3" comer reflector or an 18" long, 1.25"- diameter omnidirectional antenna (e.g., Mobile Mark N SCR14-5150).<br><br>Gregoire at 12:19-33:<br><br>3. The Transponder Controller<br><br>"Transponder controller" (18) is abbreviated terminology for "transponder signal selector controller," for it controls a transponder selector (16) which in tum selects a transponder signal. Transponder controller 18 includes amplifier 90 (e.g., JCA Technology Model No. JCA048-F01), frequency converter 91 which includes a down-converter/ mixer 92 (e.g., Mini-Circuits Laboratories Model No. ZLMX-7GLHR) coupled to local oscillator 93 (e.g., Luff Research Model No. SLSM2-38004300), low-pass filter 94 (e.g., K&L Microwave Model No. 5IB32), demodulator 95 (e.g., BroadCom Corp. Model No. BCM93180) and processor 96 (e.g., generic 486 class personal computer processor). Transponder controller 18 receives control signals from the user in a narrow frequency band that is adjacent to the users' transponder signals (See Fig. 4). Those signals are downconverted, demodulated, processed and sent as signals 34 to LNB selectors 36 and to the tunable local oscillators (frequency synthesizer) 38 in transponder selectors 16.<br><br>To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder | Gregoire discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a |

| Asserted Claims | Gregoire |
|---|---|
| signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Gregoire at Abstract:<br><br>A method and system for wireless Direct To Home satellite services signal distribution to a plurality of service requesting users. A multi-user transmitter is coupled to an earth satellite antenna to receive selectable satellite transponder signals. The multi-user transmitter includes a plurality of transponder selectors, each transponder selector preferably being associated with or even dedicated to a respective service-requesting user is provided with a user-controllable channel selector for accessing the selectable satellite transponder signals. The user-controllable channel selector is coupled to a respective user display unit and to a respective user receiver unit. A responder, which may be in the user receiver unit, is responsive to a service-requesting user-selected channel signal for transmitting a transponder selection signal to the multi-user transmitter. The transponder selection signal contains information indicative of a desired satellite transponder signal, to be transmitted to the service-requesting user associated with the respective (typically user-selected) channel signal. The multi-user transmitter transmits the selected satellite transponder signals to each of the plurality of service requesting users in response to the transponder selection signals, and may do so by broadcasting. The desired satellite transponder signal is then coupled to the service-requesting user receiver (which may contain the user-controllable channel selector) for display by the respective user display unit.<br><br>Gregoire at 3:20-4:8:<br><br>SUMMARY OF THE INVENTION |

| Asserted Claims | Gregoire |
|---|---|
| | In accordance with the present invention, an enhanced method and system is provided for wireless Direct To Home satellite services signal distribution to a plurality of service requesting users. Each user controls an IRD associated with a user display receiver, such as a television set. When the user switches channels on his IRD, a control processor senses the channel change. The processor uses this information to set control signals that are sent back on a wireless connection to a multiple-user transmitter unit that is connected to an earth station (satellite dish) antenna. The multi-user transmitter processes the control signals and sends them to a user's (preferably dedicated) transponder selector, which filters out a single transponder signal for transmission to the user. Several transponder signals are sent forward, one for each of the users. A typical implementation of the invention would have five to ten users and the local wireless channel would accommodate a comparable number of transponders. Each user has a receiver at his location that filters the broadcast signal from the transponder signal that he requested. A much smaller bandwidth results than that which would be required to transmit signals from all 32 transponders to each user.<br><br>Gregoire at 4:29-5:9:<br><br>More particularly, the multi-user transmitter is coupled to the earth satellite 30 antenna to receive selectable satellite transponder signals. The multi-user transmitter includes a plurality of transponder selectors, each transponder selector being associated with a respective service requesting user. Each service requesting user is provided with a user-controllable channel selector (IRD) for accessing the selectable satellite transponder signals. The user-controllable channel selector is coupled to a respective user display unit and to a respective user receiver unit. The user receiver unit is responsive to a service-requesting user-selected-channel signal for transmitting a transponder selection signal to the multi-user transmitter. The transponder selection signal is indicative of a desired satellite transponder signal to be transmitted to the service requesting user associated with the respective user selected channel signal.<br><br>Gregoire at 6:6-18 & associated table: |

| Asserted Claims | Gregoire |
|---|---|
| | Fig. 1 illustrates a block diagram of an embodiment of the invention that distributes a DTH signal to multiple independent users. A five user system is illustrated. DTH signal 10 is received at satellite Earth station antenna 14 and is provided to multi-user transmitter (MUT) 12. Inside the MUT, the DTH signal is split off to five different transponder selectors 16, one for each user, namely TS 1, TS2, TS3, TS4 and TS5 for this five-user embodiment. The transponder selectors are controlled by transponder controller 18 internal to MUT 12. Each transponder selector outputs the signal from a single transponder and downconverts it in frequency so that it is centered at an intermediate frequency for further processing. Each of the users has a dedicated intermediate frequency. The table below shows an example of frequency allocations for the five user embodiment wherein the U-NII communications band is at 5150 to 5350 MHz. However, the practice of the invention is not limited to the use of this band. |

| User | Transponder Selector Center Frequency | MUT Frequency |
|---|---|---|
| User 1 | 400 MHz | 5165 MHz |
| User 2 | 430 MHz | 5195 MHz |
| User 3 | 460 MHz | 5225 MHz |
| User 4 | 490 MHz | 5255 MHz |
| User 5 | 520 MHz | 5285 MHz |
| control | NA | 5320 MHz |

Gregoire at 11:1-28:

1. The transponder selectors

| Asserted Claims | Gregoire |
|---|---|
| | There are multiple transponder selectors 16 built into MUT 12, one corresponding 5 to each user in the distribution network. "Transponder selector" is abbreviated terminology for "transponder signal selector," for it selects the signal from a single transponder from the multiple transponder signals included in the DTH signal received from the satellite. The transponder selectors each receive DTH signal 10 from the satellite antenna 14, and downconverts it to an intermediate frequency so that the desired transponder signal is re-centered about a fixed intermediate frequency dedicated to that corresponding user. The unnecessary portion of the DTH signal is filtered out and the single transponder signal is sent to MUT transmitter 22. Transponder selectors 16 each include an LNB selector 36 (a voltage-controlled Lband microwave switch), frequency converter 37 which has a down-converter mixer 40 coupled to tunable local oscillator 38, and a bandpass filter 41 (e.g., K&L Microwave Model 5TB32). Transponder selectors 16 are controlled by signals 34 from the MUT transponder controller 18 that determine which transponder signal should be output to the MUT transmitter for each user. Those signals go to a lownoise block (LNB) selector 36 (a voltage-controlled L-band microwave switch) and tunable local oscillator 38 (e.g., Luff Research frequency synthesizer PN SLSM2-5501050) controls the frequency shift in mixer 40 (e.g., Mini-Circuits Laboratories Model ZMX-lOG). In the five-user embodiment, for example, the intermediate frequencies for the five users could be situated at 400 MHz, 430 MHz, 460 MHz, 490 MHz and 520 MHz respectively. However, those skilled in the art can appreciate that the invention can be practiced by embodiments utilizing other sets of frequencies and accommodating other numbers of users.<br><br>Gregoire at Claim 1:<br><br>1. A method of wireless Direct To Home satellite services signal distribution to a plurality of service-requesting users, comprising:<br><br>providing a multi-user transmitter coupled to an earth satellite antenna to receive a plurality of satellite transponder signals, the multi-user transmitter including a plurality of transponder-signal selectors; |

| Asserted Claims | Gregoire |
|---|---|
| | providing each service-requesting user with a user-controllable channel selector for accessing the satellite transponder signals, the user-controllable channel selector being coupled to a respective user display unit and to a respective user receiver unit;<br><br>transmitting to the multi-user transmitter, in response to channel selections, transponder-signal selection information indicative of desired transponder signals;<br><br>transmitting transponder signals, selected according to the transponder-signal selection information, from the multi-user transmitter to respective service-requesting users associated with the channel selections; and<br><br>coupling each selected satellite-transponder signal to the requesting user-controllable channel selector for display by the respective user display unit.<br><br>To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Gregoire discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Gregoire at 6:6-18 & associated table:<br><br>Fig. 1 illustrates a block diagram of an embodiment of the invention that distributes a DTH signal to multiple independent users. A five user system is illustrated. DTH signal 10 is received at satellite Earth station antenna 14 and is provided to multi-user transmitter (MUT) 12. Inside the MUT, the DTH signal is split off to five different transponder |

| Asserted Claims | Gregoire |
|---|---|
| | selectors 16, one for each user, namely TS 1, TS2, TS3, TS4 and TS5 for this five-user embodiment. The transponder selectors are controlled by transponder controller 18 internal to MUT 12. Each transponder selector outputs the signal from a single transponder and downconverts it in frequency so that it is centered at an intermediate frequency for further processing. Each of the users has a dedicated intermediate frequency. The table below shows an example of frequency allocations for the five user embodiment wherein the U-NII communications band is at 5150 to 5350 MHz. However, the practice of the invention is not limited to the use of this band. |

| User | Transponder Selector Center Frequency | MUT Frequency |
|---|---|---|
| User 1 | 400 MHz | 5165 MHz |
| User 2 | 430 MHz | 5195 MHz |
| User 3 | 460 MHz | 5225 MHz |
| User 4 | 490 MHz | 5255 MHz |
| User 5 | 520 MHz | 5285 MHz |
| control | NA | 5320 MHz |

Gregoire at 7:1-5:

Transponder controller 18 is controlled by control signals from user responder units, one for each user at the user location, that determine which transponder the user wants to access. The user responder units operation is described in more 5 detail hereinafter.

To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more

| Asserted Claims | Gregoire |
|---|---|
| | prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Gregoire discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Gregoire at 6:6-18 & associated table:<br><br>Fig. 1 illustrates a block diagram of an embodiment of the invention that distributes a DTH signal to multiple independent users. A five user system is illustrated. DTH signal 10 is received at satellite Earth station antenna 14 and is provided to multi-user transmitter (MUT) 12. Inside the MUT, the DTH signal is split off to five different transponder selectors 16, one for each user, namely TS 1, TS2, TS3, TS4 and TS5 for this five-user embodiment. The transponder selectors are controlled by transponder controller 18 internal to MUT 12. Each transponder selector outputs the signal from a single transponder and downconverts it in frequency so that it is centered at an intermediate frequency for further processing. Each of the users has a dedicated intermediate frequency. The table below shows an example of frequency allocations for the five user embodiment wherein the U-NII communications band is at 5150 to 5350 MHz. However, the practice of the invention is not limited to the use of this band. |

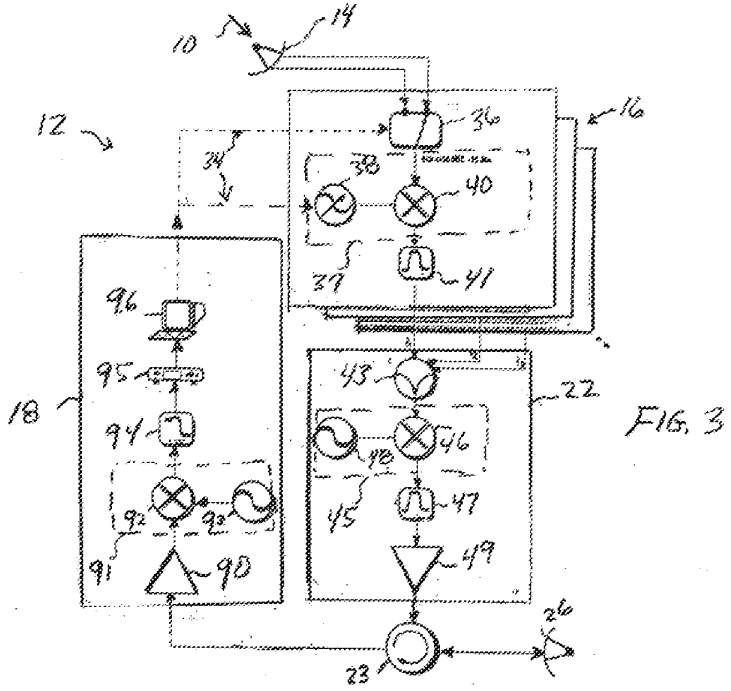
| Asserted Claims | Gregoire |
|---|---|

| User | Transponder Selector Center Frequency | MUT Frequency |
|---|---|---|
| User 1 | 400 MHz | 5165 MHz |
| User 2 | 430 MHz | 5195 MHz |
| User 3 | 460 MHz | 5225 MHz |
| User 4 | 490 MHz | 5255 MHz |
| User 5 | 520 MHz | 5285 MHz |
| control | NA | 5320 MHz |

Gregoire at 7:6-24:

Transmitter 22 bundles the transponders at the intermediate frequency band and upconverts them to a higher frequency for broadcast to the users. Circulator 23 is coupled between transmitter 22 and transponder controller 18 and transmitter/controller antenna 26. Each user has a receiver unit 24 that picks up the broadcast signal from transmitter / controller antenna 26 by user antenna 28 and through circulator 27 and receiver 29, one respectively for each user, namely Rl, R2 ... RS, downconverts it and filters out the transponder signal intended for him. Each receiver 29 is coupled to an IRD 30, one for each user, namely IRD I, IRD2 15 ... IRD5 which, in turn, are connected to respective display units 31, which can be television or workstation monitors, namely DUI, DU2 ... DUS. Each receiver unit 24 also has user responder 20, namely URI, UR2 ... URS, coupled to its respective IRD. Each user responder 20 queries its respective IRD 30 to determine the transponder requested by the user- and encodes that information for 20 transmission back to the transponder selectors in MUT 12. The control data occupies a small band adjacent to the users' transponders in the communication channel. MUT 12 has to distinguish among the control

| Asserted Claims | Gregoire |
|---|---|
| | signals from the various users and direct them to the proper transponder selectors. It does this using conventional or other multiple access techniques.<br><br>Gregoire at 12:1-17:<br><br>1. The transmitter<br><br>Transmitter 22 bundles via multi-user combiner 43 (e.g., Narda four-way combiner Model No. 431 lC-4) all of the selector signals into a reduced bandwidth package at the intermediate frequencies. It then upconverts them to the U-NII band, bandpass filters and amplifies the signal for transmission, using frequency converter 45 which includes up-converter/ mixer 46 (e.g., Mini-Circuits Laboratories Model ZMX-7GLHR) coupled to local oscillator 48 (e.g., Luff Research Model No. SLSM2-38004300), bandpass filter 47 (e.g., K & L Microwave Model No. 51B32-5275/f400), amplifier 49 (e.g., JCA Technology Model No. JCA048-F01), circulator 23 (e.g., Narda three port circulator Model No. 4914) and transmitter/ controller antenna 26 . In an example depicted in Fig. 4, three user selected transponder signals are packaged into the U-NII band at 5150 - 5350 MHz. This is considerably smaller than the 1000 MHz necessary to transmit all the DTH transponders. Transmitter/ controller antenna 26 can be a U-NII antenna, which is a small 3" x 3" comer reflector or an 18" long, 1.25"- diameter omnidirectional antenna (e.g., Mobile Mark N SCR14-5150).<br><br>Gregoire at 12:19-33:<br><br>3. The Transponder Controller<br><br>"Transponder controller" (18) is abbreviated terminology for "transponder signalselector controller," for it controls a transponder selector (16) which in tum selects a transponder signal. Transponder controller 18 includes amplifier 90 (e.g., JCA Technology Model No. JCA048-F01), frequency converter 91 which includes a down-converter/ mixer 92 (e.g., Mini-Circuits Laboratories Model No. ZLMX-7GLHR) coupled to local oscillator 93 (e.g., Luff Research Model No. SLSM2-38004300), low-pass filter 94 (e.g., K&L Microwave |

| Asserted Claims | Gregoire |
|---|---|
| | Model No. 5IB32), demodulator 95 (e.g., BroadCom Corp. Model No. BCM93180) and processor 96 (e.g., generic 486 class personal computer processor). Transponder controller 18 receives control signals from the user in a narrow frequency band that is adjacent to the users' transponder signals (See Fig. 4). Those signals are downconverted, demodulated, processed and sent as signals 34 to LNB selectors 36 and to the tunable local oscillators (frequency synthesizer) 38 in transponder selectors 16.<br><br>Gregoire at Fig. 3:<br><br>  <br><br>FIG. 3<br><br>To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light |

| Asserted Claims | Gregoire |
|---|---|
| | of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Gregoire discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Gregoire at 3:6-16:<br><br>Therefore, there exists a need for an effective system for DTH distribution having a limited bandwidth local wireless transmission to multiple independent users in a setting where it is not possible to have a large antenna with its corresponding stringing of cable connections or where it is undesirable to erect multiple large DTH distribution antennas. Further, there is a need for an approach where the DTH signal does not need to be reformatted and exposed to noise degradation such that a high quality digital signal can be provided to the user. Also, by not decoding the signal until it reaches the TV or workstation, a variety of modulation formats (such as QPSK, FM, QAM) can be handled. Even mixed modulation formats could be utilized.<br><br>Gregoire at 6:6-18 & associated table:<br><br>Fig. 1 illustrates a block diagram of an embodiment of the invention that distributes a DTH signal to multiple independent users. A five user system is illustrated. DTH signal 10 is received at satellite Earth station antenna 14 and is provided to multi-user transmitter (MUT) 12. Inside the MUT, the DTH signal is split off to five different transponder selectors 16, one for each user, namely TS 1, TS2, TS3, TS4 and TS5 for this five-user embodiment. The transponder selectors are controlled by transponder controller 18 internal |

| Asserted Claims | Gregoire |
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| | to MUT 12. Each transponder selector outputs the signal from a single transponder and downconverts it in frequency so that it is centered at an intermediate frequency for further processing. Each of the users has a dedicated intermediate frequency. The table below shows an example of frequency allocations for the five user embodiment wherein the U-NII communications band is at 5150 to 5350 MHz. However, the practice of the invention is not limited to the use of this band. |

| User | Transponder Selector Center Frequency | MUT Frequency |
|---|---|---|
| User 1 | 400 MHz | 5165 MHz |
| User 2 | 430 MHz | 5195 MHz |
| User 3 | 460 MHz | 5225 MHz |
| User 4 | 490 MHz | 5255 MHz |
| User 5 | 520 MHz | 5285 MHz |
| control | NA | 5320 MHz |

Gregoire at 7:1-5:

Transponder controller 18 is controlled by control signals from user responder units, one for each user at the user location, that determine which transponder the user wants to access. The user responder units operation is described in more 5 detail hereinafter.

Gregoire at 7:6-24:

Transmitter 22 bundles the transponders at the intermediate frequency band and upconverts them to a higher frequency for broadcast to the users. Circulator 23 is coupled between

| Asserted Claims | Gregoire |
|---|---|
| | transmitter 22 and transponder controller 18 and transmitter/controller antenna 26. Each user has a receiver unit 24 that picks up the broadcast signal from transmitter / controller antenna 26 by user antenna 28 and through circulator 27 and receiver 29, one respectively for each user, namely Rl, R2 ... RS, downconverts it and filters out the transponder signal intended for him. Each receiver 29 is coupled to an IRD 30, one for each user, namely IRD I, IRD2 15 ... IRD5 which, in turn, are connected to respective display units 31, which can be television or workstation monitors, namely DUI, DU2 ... DUS. Each receiver unit 24 also has user responder 20, namely URI, UR2 ... URS, coupled to its respective IRD. Each user responder 20 queries its respective IRD 30 to determine the transponder requested by the user- and encodes that information for 20 transmission back to the transponder selectors in MUT 12. The control data occupies a small band adjacent to the users' transponders in the communication channel. MUT 12 has to distinguish among the control signals from the various users and direct them to the proper transponder selectors. It does this using conventional or other multiple access techniques.<br>Gregoire at 9:1-5:<br><br>The signal is then sent from receiver 29 to the user's IRD 30 (e.g., a Sony or HNS) for decoding and display on display unit 31 (e.g., a Sony television). The IRD only needs a single transponder signal to get all of the channel guide information and the user's authorization codes. This capability is significant in making the system transparent to the user.<br><br>Gregoire at 12:1-17:<br><br>1. The transmitter<br><br>Transmitter 22 bundles via multi-user combiner 43 (e.g., Narda four-way combiner Model No. 431 lC-4) all of the selector signals into a reduced bandwidth package at the intermediate frequencies. It then upconverts them to the U-NII band, bandpass filters and amplifies the signal for transmission, using frequency converter 45 which includes up-converter/ mixer 46 (e.g., Mini-Circuits Laboratories Model ZMX-7GLHR) coupled to local oscillator 48 (e.g., Luff Research Model No. SLSM2-38004300), bandpass filter 47 |

| Asserted Claims | Gregoire |
|---|---|
| | (e.g., K & L Microwave Model No. 51B32-5275/f400), amplifier 49 (e.g., JCA Technology Model No. JCA048-F01), circulator 23 (e.g., Narda three port circulator Model No. 4914) and transmitter/ controller antenna 26 . In an example depicted in Fig. 4, three user selected transponder signals are packaged into the U-NII band at 5150 - 5350 MHz. This is considerably smaller than the 1000 MHz necessary to transmit all the DTH transponders. Transmitter/ controller antenna 26 can be a U-NII antenna, which is a small 3" x 3" comer reflector or an 18" long, 1.25"- diameter omnidirectional antenna (e.g., Mobile Mark N SCR14-5150).<br><br>Gregoire at 12:19-33:<br><br>3. The Transponder Controller<br><br>"Transponder controller" (18) is abbreviated terminology for "transponder signalselector controller," for it controls a transponder selector (16) which in tum selects a transponder signal. Transponder controller 18 includes amplifier 90 (e.g., JCA Technology Model No. JCA048-F01), frequency converter 91 which includes a down-converter/ mixer 92 (e.g., Mini-Circuits Laboratories Model No. ZLMX-7GLHR) coupled to local oscillator 93 (e.g., Luff Research Model No. SLSM2-38004300), low-pass filter 94 (e.g., K&L Microwave Model No. 5IB32), demodulator 95 (e.g., BroadCom Corp. Model No. BCM93180) and processor 96 (e.g., generic 486 class personal computer processor). Transponder controller 18 receives control signals from the user in a narrow frequency band that is adjacent to the users' transponder signals (See Fig. 4). Those signals are downconverted, demodulated, processed and sent as signals 34 to LNB selectors 36 and to the tunable local oscillators (frequency synthesizer) 38 in transponder selectors 16.<br><br>To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Gregoire |
|---|---|
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Gregoire discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>*See, e.g.*:<br><br>Gregoire at 6:6-18 & associated table:<br><br>Fig. 1 illustrates a block diagram of an embodiment of the invention that distributes a DTH signal to multiple independent users. A five user system is illustrated. DTH signal 10 is received at satellite Earth station antenna 14 and is provided to multi-user transmitter (MUT) 12. Inside the MUT, the DTH signal is split off to five different transponder selectors 16, one for each user, namely TS 1, TS2, TS3, TS4 and TS5 for this five-user embodiment. The transponder selectors are controlled by transponder controller 18 internal to MUT 12. Each transponder selector outputs the signal from a single transponder and downconverts it in frequency so that it is centered at an intermediate frequency for further processing. Each of the users has a dedicated intermediate frequency. The table below shows an example of frequency allocations for the five user embodiment wherein the U-NII communications band is at 5150 to 5350 MHz. However, the practice of the invention is not limited to the use of this band. |

| Asserted Claims | Gregoire |
|---|---|

| User | Transponder Selector Center Frequency | MUT Frequency |
|---|---|---|
| User 1 | 400 MHz | 5165 MHz |
| User 2 | 430 MHz | 5195 MHz |
| User 3 | 460 MHz | 5225 MHz |
| User 4 | 490 MHz | 5255 MHz |
| User 5 | 520 MHz | 5285 MHz |
| control | NA | 5320 MHz |

Gregoire at 7:1-5:

Transponder controller 18 is controlled by control signals from user responder units, one for each user at the user location, that determine which transponder the user wants to access. The user responder units operation is described in more 5 detail hereinafter.
Gregoire at 7:6-24:

Transmitter 22 bundles the transponders at the intermediate frequency band and upconverts them to a higher frequency for broadcast to the users. Circulator 23 is coupled between transmitter 22 and transponder controller 18 and transmitter/controller antenna 26. Each user has a receiver unit 24 that picks up the broadcast signal from transmitter / controller antenna 26 by user antenna 28 and through circulator 27 and receiver 29, one respectively for each user, namely Rl, R2 ... RS, downconverts it and filters out the transponder signal intended for him. Each receiver 29 is coupled to an IRD 30, one for each user, namely IRD I, IRD2 15 ... IRD5 which, in turn, are connected to respective display units 31, which can be television or workstation monitors, namely DUI, DU2 ... DUS. Each receiver unit 24 also has user responder 20, namely URI, UR2 ... URS, coupled to its respective IRD. Each

| Asserted Claims | Gregoire |
|---|---|
| | user responder 20 queries its respective IRD 30 to determine the transponder requested by the user- and encodes that information for 20 transmission back to the transponder selectors in MUT 12. The control data occupies a small band adjacent to the users' transponders in the communication channel. MUT 12 has to distinguish among the control signals from the various users and direct them to the proper transponder selectors. It does this using conventional or other multiple access techniques.<br><br>To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Gregoire discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Gregoire at 7:6-24:<br>Transmitter 22 bundles the transponders at the intermediate frequency band and upconverts them to a higher frequency for broadcast to the users. Circulator 23 is coupled between transmitter 22 and transponder controller 18 and transmitter/controller antenna 26. Each user has a receiver unit 24 that picks up the broadcast signal from transmitter / controller antenna 26 by user antenna 28 and through circulator 27 and receiver 29, one respectively for each user, namely Rl, R2 ... RS, downconverts it and filters out the transponder signal intended for him. Each receiver 29 is coupled to an IRD 30, one for each user, namely IRD I, IRD2 15 ... IRD5 which, in turn, are connected to respective display units 31, which can be television or workstation monitors, namely DUI, DU2 ... DUS. Each receiver unit 24 also has user responder 20, namely URI, UR2 ... URS, coupled to its respective IRD. Each |

| Asserted Claims | Gregoire |
|---|---|
| | user responder 20 queries its respective IRD 30 to determine the transponder requested by the user- and encodes that information for 20 transmission back to the transponder selectors in MUT 12. The control data occupies a small band adjacent to the users' transponders in the communication channel. MUT 12 has to distinguish among the control signals from the various users and direct them to the proper transponder selectors. It does this using conventional or other multiple access techniques.<br><br>To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Gregoire discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Gregoire at 7:6-24:<br><br>Transmitter 22 bundles the transponders at the intermediate frequency band and upconverts them to a higher frequency for broadcast to the users. Circulator 23 is coupled between transmitter 22 and transponder controller 18 and transmitter/controller antenna 26. Each user has a receiver unit 24 that picks up the broadcast signal from transmitter / controller antenna 26 by user antenna 28 and through circulator 27 and receiver 29, one respectively for each user, namely RI, R2 ... RS, downconverts it and filters out the transponder signal intended for him. Each receiver 29 is coupled to an IRD 30, one for each user, namely IRD I, IRD2 15 ... IRD5 which, in turn, are connected to respective display units 31, which can be television or workstation monitors, namely DUI, DU2 ... DUS. Each receiver unit 24 |

| Asserted Claims | Gregoire |
|---|---|
| | also has user responder 20, namely URI, UR2 ... URS, coupled to its respective IRD. Each user responder 20 queries its respective IRD 30 to determine the transponder requested by the user- and encodes that information for 20 transmission back to the transponder selectors in MUT 12. The control data occupies a small band adjacent to the users' transponders in the communication channel. MUT 12 has to distinguish among the control signals from the various users and direct them to the proper transponder selectors. It does this using conventional or other multiple access techniques.<br><br>To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

**Exhibit B7 – Hicks Invalidity Claim Chart**

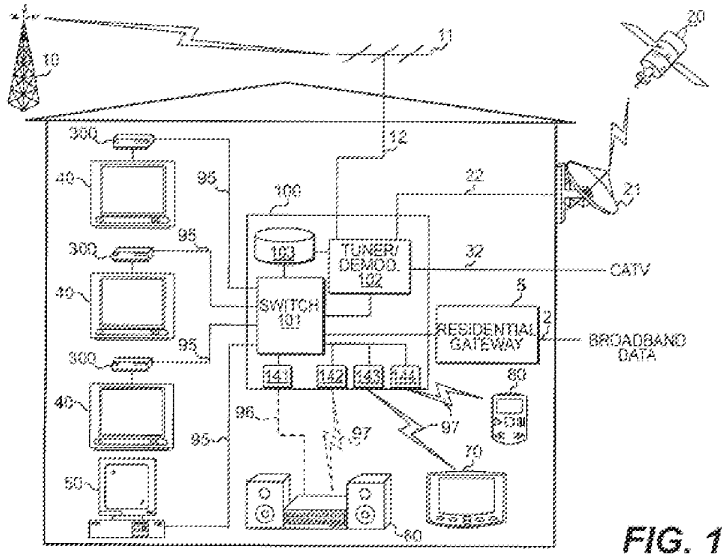
## INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Hicks

U.S. Patent No. 8,601,519 B1 ("Hicks") was filed on December 28, 2000 and issued on December 3, 2013. Hicks therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(e). For the reasons listed below, Hicks invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Hicks |
|---|---|
| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Hicks discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Hicks at 3:35-53: |

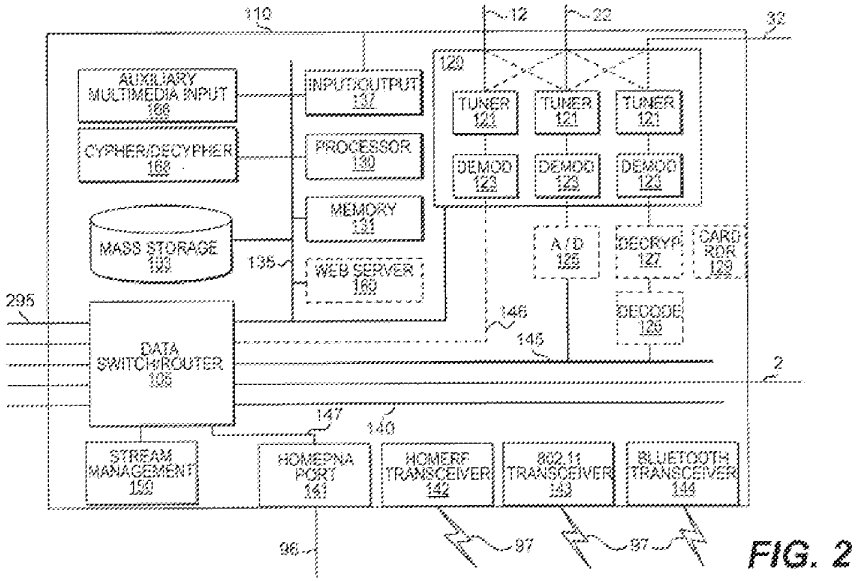
[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

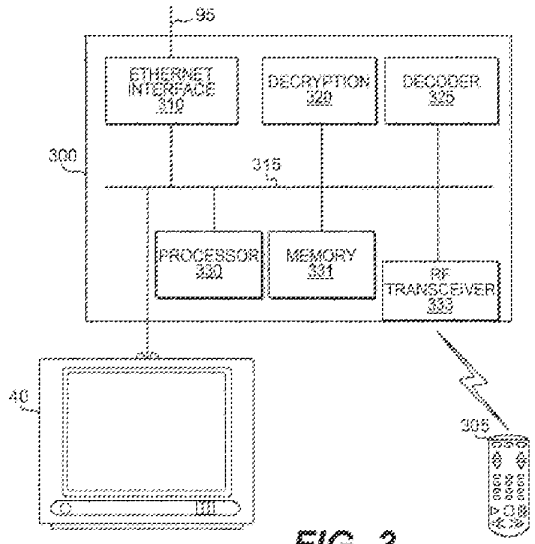
| Asserted Claims | Hicks |
|---|---|
| | In the preferred embodiment of the present invention, the digital residential entertainment system is based on a client/ server architecture. A core element of the system is a broad band multimedia gateway (BMG) that can operate both as a multimedia gateway and content server within a client/server architecture. It contains an Ethernet switch that, in a typical embodiment, is capable of data communications of at least 100Mbps per switch port. The BMG can receive video, audio and other forms of multimedia content from a variety of broadcasts (e.g., direct digital broadcast satellite TV, digital cable TV, terrestrial broadcast analog and/or digital TV), Intranet, and Internet Sources. As used to describe embodiments of the present invention, the term "multimedia" encompasses video, audio, audio-video, text, graphics, facsimile, data, animation, and combinations thereof. The BMG can deliver multimedia content to a wide range of information appliances, such as digital televisions, computers, sound systems, electronic book displays, and graphical data tablets.<br><br>Hicks at 6:1-16:<br><br>Tuner/demodulator 102 can be coupled to one or more of a plurality of multimedia transmission systems, where each multimedia transmission system transmits a plurality of transmission signals (e.g., audio, video, television, data, etc.). Examples of multimedia transmission systems include CATV, direct broadcast satellite TV, direct broadcast satellite radio, terrestrial broadcast TV, terrestrial broadcast radio, and so forth. Tuner/demodulator 102 can be coupled to a CATV system (e.g., a headend of a CATV system) via communications link32 (e.g., a coaxial cable). A plurality of transmission signals from a direct broadcast satellite TV system including satellite 20 and satellite dish 21 can be received by tuner/ demodulator 102 via communications link 22. Also, tuner/ demodulator 102 can be coupled to a terrestrial broadcast TV system via transmitter 10, antenna 11, and communications link 12.<br><br>Hicks at FIG. 1: |

| Asserted Claims | Hicks |
|---|---|
| |  <br>FIG. 1<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Hicks discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Hicks at 3:35-67: |

| Asserted Claims | Hicks |
|---|---|
| | In the preferred embodiment of the present invention, the digital residential entertainment system is based on a client/ server architecture. A core element of the system is a broad band multimedia gateway (BMG) that can operate both as a multimedia gateway and content server within a client/server architecture. It contains an Ethernet switch that, in a typical embodiment, is capable of data communications of at least 100Mbps per switch port. The BMG can receive video, audio and other forms of multimedia content from a variety of broadcasts (e.g., direct digital broadcast satellite TV, digital cable TV, terrestrial broadcast analog and/or digital TV), Intranet, and Internet Sources. As used to describe embodiments of the present invention, the term "multimedia" encompasses video, audio, audio-video, text, graphics, facsimile, data, animation, and combinations thereof. The BMG can deliver multimedia content to a wide range of information appliances, such as digital televisions, computers, sound systems, electronic book displays, and graphical data tablets.<br><br>A digital residential entertainment system can include a BMG that has multiple tuner/demodulators which receive broadcast multimedia content and send the received tuner/demodulators have a shared communication link to a switch port of the Ethernet switch. Upon receiving multimedia content, the BMG can transmit the multimedia content through the Ethernet switch over the twisted pair data network to an information appliance (e.g., a thin-client digital set-top box, an audio system, a wireless MP3 player, or a wireless electronic device), store the multimedia content for future access, or transmit and store coincidentally (e.g., simultaneously). The BMG includes a mass storage device (e.g., a computer hard drive) that can store multimedia content from broadcast sources, an Intranet or the Internet.<br><br>Hicks at 4:21-37:<br><br>In an embodiment, the BMG can include a Web-server to support a structured, Web browser-based user interface on each information appliance coupled to the BMG, such as digital STBs, audio systems, wireless MP3 players and wireless electronic books. For example, an infrared remote control and/or an optional wireless keyboard can |

| Asserted Claims | Hicks |
|---|---|
| | communicate with a digital STB to interact with the Web browser-based graphical user interface that is presented on an information appliance such as a TV screen. The Web browser-based graphical user interface may be used to access broadcast and on-demand video and audio content and multimedia applications and services. Because the enhanced functionality resides in the central BMG as opposed to peripheral thick-client digital STBs, a broad range of functionality, including record/store/playback of broadcast programs, video/audio on demand, interactive TV. Web surfing, e-mail and electronic shopping, is accessible from every thin-client digital STB in the home.<br><br>Hicks at 11:3-19:<br><br>TC DSTB 300 can include an Ethernet interface 310 when coupled to a BMG including an Ethernet switch. When TC DSTB300 is coupled to a BMG having a different type of data switch supporting a different communications protocol (e.g., an ATM router), the TCDSTB300 can include a data switch interface compatible with that different type of data switch. TC DSTB 300 can receive a digital information signal from the data switch and process the digital information signal for output as an audio and/or video signal. For example, TC DSTB 300 can include decryption logic 320 coupled to the Ethernet interface 310 via a bus 315, and the decryption logic 320 can decrypt digital information signals that are sent by the data switch in an encrypted and/or protected format. Decoder logic 325 can also be included in TC DSTB300 to convert a digital information signal from a first digital format (e.g., a transmission format, a compressed format) to a second digital format (e.g., a display format).<br><br>Hicks at Fig. 2: |

| Asserted Claims | Hicks |
|---|---|
| |  <br>FIG. 2<br><br>Hicks at Fig. 3: |

| Asserted Claims | Hicks |
|---|---|
| |  <br>FIG. 3<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one | Hicks discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*: |

| Asserted Claims | Hicks |
|---|---|
| broadband LNB signal based on the transponder select information; | Hicks at 4:37-5:3:<br><br>For example, to view broadcast video content, a consumer can use an infrared remote control to select the content that he or she wants to view by utilizing a broadcast program guide, a search function, entering a channel number, and so on. After the consumer makes a selection, the thin-client digital STB communicates with the BMG requesting that the digital multimedia content be delivered to the digital STB. When the consumer selects playing of a broadcast satellite television channel, for example, the BMG can tune a demodulator/tuner to the selected broadcast channel and begin streaming the selected MPEG video stream through the Ethernet switch and over the twisted pair wiring to the digital STB where the video steam is decoded and displayed on the TV. Service providers will be able to download multimedia content, such as movies, to the mass storage device of the BMG. The downloading can be accomplished using a broadband data service to the home, such as Asymmetric Digital Subscriber Line (ADSL), or via a satellite direct multicast/broadcast service. In a movies on-demand service, when a consumer wants to watch a movie, they would use their infrared remote control to access a Web page on the BMG Web server to determine what movies are currently stored on the BMG. After the consumer selects a movie for viewing, the BMG would begin streaming the selected movie out to the thin-client digital STB/TV for viewing. While viewing a movie-on-demand, a consumer would have playback control. Such as play, pause, stop, rewind and fast forward. The consumer could also opt to purchase a personal copy of the movie. The copy could be stored on the BMG, or output to separate mass storage medium (e.g., written to a Digital Versatile Disc). Audio content, such as an albums-on-demand service, could be implemented in a similar manner to allow playback and purchasing of audio content.<br><br>Hicks at 6:17-36:<br><br>The plurality of transmission signals from the multimedia transmission systems can be transmitted over a plurality of information channels, such as, for example, frequency divided information channels, time divided information channels, code divided information channels, wave divided information channels, or dense wave divided information channels. A tuner of tuner/demodulator 102 can select an information channel of the plurality of |

| Asserted Claims | Hicks |
|---|---|
| | information channels and pass a transmission signal to a demodulator of tuner/demodulator 102. The demodulator of tuner/demodulator 102 can extract an information signal from the transmission signal. For example, a tuner can pass a transmission signal at a particular frequency to a demodulator, and the demodulator can extract the information signal from the transmission signal. In such an example, the transmission signal includes a carrier signal and an information signal. The information signal can be a discrete (i.e., singular) information signal or a multiplexed, composite information signal. For example, a multiplexed, composite information signal may contain a plurality of information signals where discrete information signals are time-division multiplexed, frequency-division multiplexed, and/or code-division multiplexed. Accordingly, tuner/demodulator 102 can include a plurality of tuners and/or demodulators to isolate an information signal that is multiply multiplexed (e.g., frequency-multiplexed and time-multiplexed).<br><br>The information signal can be an analog information signal or a digital information signal. When the information signal is an analog information signal, an analog-to-digital converter can convert the analog information signal to a digital information signal (e.g., a Motion Picture Experts Group 2 (MPEG-2) signal). In an embodiment, a BMG can support multiple MPEG2 encoding sessions (e.g., two or more MPEG2 encoding sessions) and handle overlay processing. An example of overlay processing is presenting MPEG2 or other digital information in a multiple layer format. In another embodiment, a service application running on a BMG system can support transparent layers such as, for example, overlaying a Web page on top of a TV program image used for interactive TV services.<br><br>Hicks at 8:23-37:<br><br>Signal processing circuit 120 can include a plurality of tuners 121 and a plurality of demodulators 123, where each demodulator 123 is coupled to a tuner 121. Each tuner can be coupled to one or more communications links, e.g., communications links 12, 22, and 32. When a communication link is coupled to a plurality of tuners 121, a plurality of information signals (e.g., television programs, movies, audio, songs, albums, etc.) broadcast over a communications link can be sent to data switch/router 105 and/or mass storage device 103 to allow real-time viewing and/or playback control (e.g., viewing, |

| Asserted Claims | Hicks |
|---|---|
| | playing, recording, pausing, etc.) of multiple information signals. For example, a viewer at a first television may view a first CATV program, and another viewer at a second television may view a second CATV program. Further, a viewer can view a first CATV program while a second CATV program is recorded to the mass storage device.<br><br>Hicks 12:38-51:<br><br>The digital data switch receives an instruction to send a second information signal from the second information appliance via the second broadband communications link (box 440), and sends the instruction to send a second information signal to a processor (box 445). The processor sends a select second transmission instruction (e.g., to the multichannel tuner) (box 450). The second transmission signal of the plurality of transmission signals is selected (e.g., by the multichannel tuner) (box 455), and demodulated to isolate a second information signal (box 460). The second information signal is sent to the digital data switch (box 465), and the digital data switch sends the second information signal to the second information appliance via the second broadband communications link (box 470).<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Hicks discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Hicks at 6:17-42: |

| Asserted Claims | Hicks |
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| | The plurality of transmission signals from the multimedia transmission systems can be transmitted over a plurality of information channels, such as, for example, frequency divided information channels, time divided information channels, code divided information channels, wave divided information channels, or dense wave divided information channels. A tuner of tuner/demodulator 102 can select an information channel of the plurality of information channels and pass a transmission signal to a demodulator of tuner/demodulator 102. The demodulator of tuner/demodulator 102 can extract an information signal from the transmission signal. For example, a tuner can pass a transmission signal at a particular frequency to a demodulator, and the demodulator can extract the information signal from the transmission signal. In such an example, the transmission signal includes a carrier signal and an information signal. The information signal can be a discrete (i.e., singular) information signal or a multiplexed, composite information signal. For example, a multiplexed, composite information signal may contain a plurality of information signals where discrete information signals are time-division multiplexed, frequency-division multiplexed, and/or code-division multiplexed. Accordingly, tuner/demodulator 102 can include a plurality of tuners and/or demodulators to isolate an information signal that is multiply multiplexed (e.g., frequency-multiplexed and time-multiplexed).<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Hicks discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Hicks at 6:17-36: |

| Asserted Claims | Hicks |
|---|---|
| | The plurality of transmission signals from the multimedia transmission systems can be transmitted over a plurality of information channels, such as, for example, frequency divided information channels, time divided information channels, code divided information channels, wave divided information channels, or dense wave divided information channels. A tuner of tuner/demodulator 102 can select an information channel of the plurality of information channels and pass a transmission signal to a demodulator of tuner/demodulator 102. The demodulator of tuner/demodulator 102 can extract an information signal from the transmission signal. For example, a tuner can pass a transmission signal at a particular frequency to a demodulator, and the demodulator can extract the information signal from the transmission signal. In such an example, the transmission signal includes a carrier signal and an information signal. The information signal can be a discrete (i.e., singular) information signal or a multiplexed, composite information signal. For example, a multiplexed, composite information signal may contain a plurality of information signals where discrete information signals are time-division multiplexed, frequency-division multiplexed, and/or code-division multiplexed. Accordingly, tuner/demodulator 102 can include a plurality of tuners and/or demodulators to isolate an information signal that is multiply multiplexed (e.g., frequency-multiplexed and time-multiplexed).<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the | Hicks discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*: |

| Asserted Claims | Hicks |
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| programs over a digital local area network (LAN) to STBs. | Hicks at 3:35-67:<br><br>In the preferred embodiment of the present invention, the digital residential entertainment system is based on a client/server architecture. A core element of the system is a broad band multimedia gateway (BMG) that can operate both as a multimedia gateway and content server within a client/server architecture. It contains an Ethernet switch that, in a typical embodiment, is capable of data communications of at least 100Mbps per switch port. The BMG can receive video, audio and other forms of multimedia content from a variety of broadcasts (e.g., direct digital broadcast satellite TV, digital cable TV, terrestrial broadcast analog and/or digital TV), Intranet, and Internet Sources. As used to describe embodiments of the present invention, the term "multimedia" encompasses video, audio, audio-video, text, graphics, facsimile, data, animation, and combinations thereof. The BMG can deliver multimedia content to a wide range of information appliances, such as digital televisions, computers, sound systems, electronic book displays, and graphical data tablets.<br><br>A digital residential entertainment system can include a BMG that has multiple tuner/demodulators which receive broadcast multimedia content and send the received tuner/demodulators have a shared communication link to a switch port of the Ethernet switch. Upon receiving multimedia content, the BMG can transmit the multimedia content through the Ethernet switch over the twisted pair data network to an information appliance (e.g., a thin-client digital set-top box, an audio system, a wireless MP3 player, or a wireless electronic device), store the multimedia content for future access, or transmit and store coincidentally (e.g., simultaneously). The BMG includes a mass storage device (e.g., a computer hard drive) that can store multimedia content from broadcast sources, an Intranet or the Internet.<br><br>Hicks at 4:37-5:3:<br><br>For example, to view broadcast video content, a consumer can use an infrared remote control to select the content that he or she wants to view by utilizing a broadcast program guide, a search function, entering a channel number, and so on. After the consumer makes |

| Asserted Claims | Hicks |
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| | a selection, the thin-client digital STB communicates with the BMG requesting that the digital multimedia content be delivered to the digital STB. When the consumer selects playing of a broadcast satellite television channel, for example, the BMG can tune a demodulator/tuner to the selected broadcast channel and begin streaming the selected MPEG video stream through the Ethernet switch and over the twisted pair wiring to the digital STB where the video steam is decoded and displayed on the TV. Service providers will be able to download multimedia content, such as movies, to the mass storage device of the BMG. The downloading can be accomplished using a broadband data service to the home, such as Asymmetric Digital Subscriber Line (ADSL), or via a satellite direct multicast/broadcast service. In a movies on-demand service, when a consumer wants to watch a movie, they would use their infrared remote control to access a Web page on the BMG Web server to determine what movies are currently stored on the BMG. After the consumer selects a movie for viewing, the BMG would begin streaming the selected movie out to the thin-client digital STB/TV for viewing. While viewing a movie-on-demand, a consumer would have playback control. Such as play, pause, stop, rewind and fast forward. The consumer could also opt to purchase a personal copy of the movie. The copy could be stored on the BMG, or output to separate mass storage medium (e.g., written to a Digital Versatile Disc). Audio content, such as an albums-on-demand service, could be implemented in a similar manner to allow playback and purchasing of audio content.<br><br>Hicks at 6:43-56:<br><br>The information signal can be an analog information signal or a digital information signal. When the information signal is an analog information signal, an analog-to-digital converter can convert the analog information signal to a digital information signal (e.g., a Motion Picture Experts Group 2 (MPEG-2) signal). In an embodiment, a BMG can support multiple MPEG2 encoding sessions (e.g., two or more MPEG2 encoding sessions) and handle overlay processing. An example of overlay processing is presenting MPEG2 or other digital information in a multiple layer format. In another embodiment, a service application running on a BMG system can support transparent layers such as, for example, overlaying a Web page on top of a TV program image used for interactive TV services. |

| Asserted Claims | Hicks |
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| | Hicks at 7:56-67:<br><br>In accordance with an embodiment of the present invention, multiple information appliances can receive a digital information signal from data switch 101. For example, a television program broadcast by a CATV system can be received by BMG 100, and BMG can send that television program to a plurality of televisions 40 and/or computer 50 such that a user at an information appliance views the television program in real-time. BMG 100 can also store that television program on mass storage device 103 so that a user can view the television program at a later time on one or more of the information appliances (e.g., televisions 40 and/or computer 50).<br><br>Hicks at 11:48-12:3:<br><br>FIG. 6 illustrates another embodiment of the present invention. A BMG 600 can include a plurality of buses to interconnect BMG components. For example, the plurality of buses can include a media bus 610, a network bus 615, and a system data bus 620. Media bus 610 can receive information signals (e.g., broadcast signals, multimedia signals, and so on) from signal processing circuit 120. In an embodiment, signal processing circuit 120 and media bus 610 are coupled via system cipher/dechiper [sic] logic 628. System data bus 620 can be coupled to the media bus 610 to receive information signals (e.g., for storage on mass storage device 103, for sending to information appliances, and so on). In an embodiment, media bus 610 and system data bus 620 can be coupled to a video overlay processor 605 to support at least in part picture-in picture operations, picture-in-graphic operations, and other video overlay operations. System data bus 620 can be coupled to data switch/router 105 via network bus 615 to receive information signals (e.g., real-time information signals), overlayed information signals and stored information signals (e.g., stored on mass storage device 103). Data switch/router 105 can be coupled to a plurality of high bandwidth communications links 95 for transmission of information signals to information appliances.<br><br>Hicks at Fig. 2: |

| Asserted Claims | Hicks |
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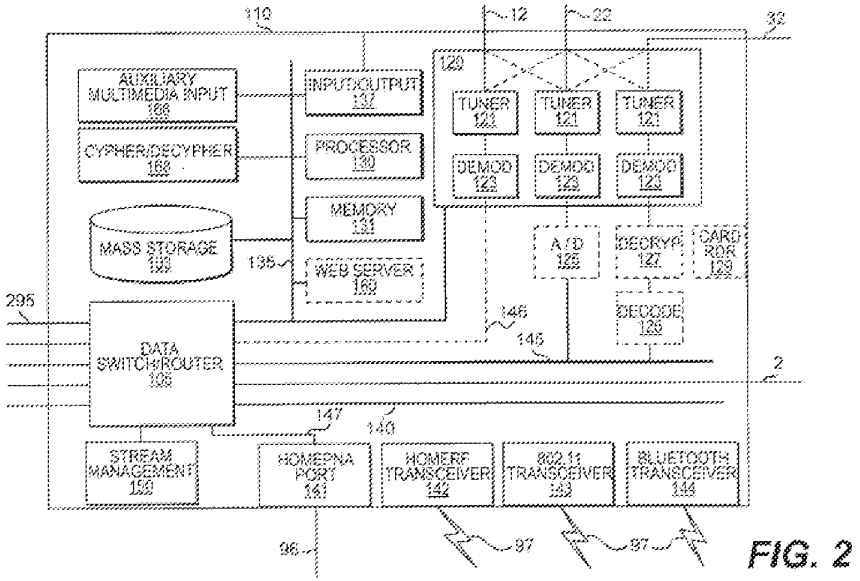
| |  <br>FIG. 2<br><br>Hicks at Fig. 3: |

| Asserted Claims | Hicks |
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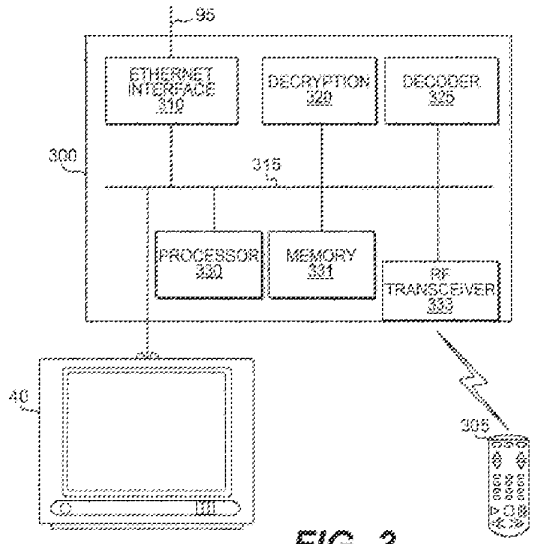
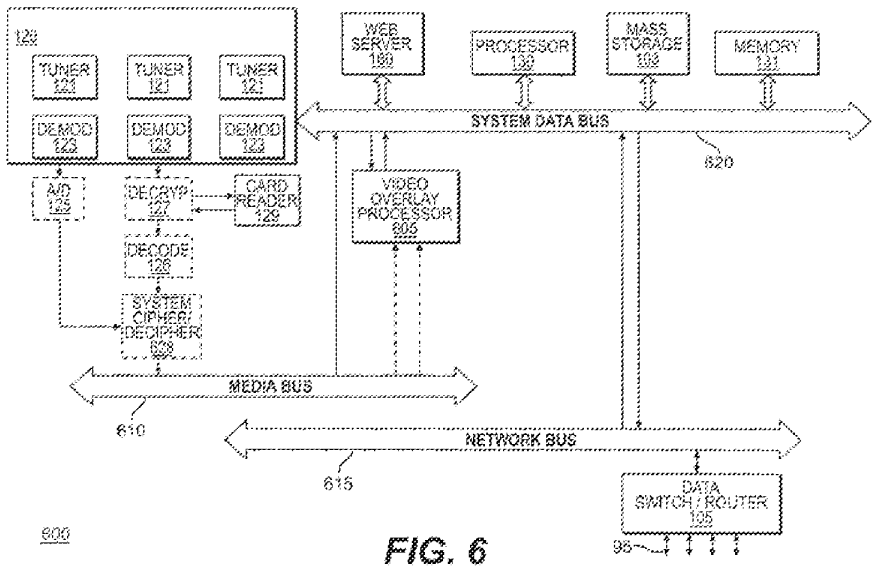
| |  <br>FIG. 3<br><br>Hicks at Fig. 6: |

| Asserted Claims | Hicks |
|---|---|
| |  <br>FIG. 6<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Hicks discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Hicks |
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| | Hicks at 4:38-41:<br><br>For example, to view broadcast video content, a consumer can use an infrared remote control to select the content that he or she wants to view by utilizing a broadcast program guide, a search function, entering a channel number, and so on. After the consumer makes a selection, the thin-client digital STB communicates with the BMG requesting that the digital multimedia content be delivered to the digital STB. When the consumer selects playing of a broadcast satellite television channel, for example, the BMG can tune a demodulator/tuner to the selected broadcast channel and begin streaming the selected MPEG video stream through the Ethernet switch and over the twisted pair wiring to the digital STB where the video steam is decoded and displayed on the TV.<br><br>Hicks at 11:34-47:<br><br>In an embodiment, TC DSTB 300 controls the display of a Web browser-based GUI ("WBB GUI") on television 40. The WBB GUI can provide an interface for accessing multimedia applications and content, and the TC DSTB 300 can control the display of the WBB GUI based at least in part on user input received via remote 305 and program instructions and data stored in TC DSTB300 and/or a BMG coupled to the TC DSTB 300. For example, applications that can be executed based on the WBB GUI and the remote 305 include a broadcast program guide; broadcast TV viewing control; broadcast audio listening control; movies-on-demand; audio-on-demand; recording, storage and playback of broadcast programs; interactive TV: Web-enhanced TV; e-mail communications; Web surfing; electronic surfing; and so forth.<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Hicks |
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| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Hicks discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Hicks discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Hicks does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Hicks alone or it would have been obvious to combine Hicks with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

**Exhibit B8 – Kang Invalidity Claim Chart**

## INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Kang

Korean Patent No. KR0142730 ("Kang") was filed on April 4, 1995 published on November 25, 1996. Kang therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (b). For the reasons listed below, Kang invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Kang |
|---|---|
| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Kang discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Kang at Abstract: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Kang |
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| | A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system.<br><br>Kang at 1:<br><br>In general, the Satellite Master Antenna Television (hereinafter abbreviated as "SMATV") is a system that receives satellite broadcasts through a central antenna used jointly and distributes them to public service areas (e.g., apartments, hotels, hospitals, etc.).<br><br>Kang at 1:<br><br>Fig. 1 is a block diagram showing such a conventional satellite broadcast joint reception circuit. A satellite signal received through a joint antenna (ANT) is distributed to a predetermined number of channels by the distributing unit (10). |

| Asserted Claims | Kang |
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| | Kang at 1:<br><br>The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver.<br><br>Kang at 2:<br><br>In Fig. 2, it is composed of a transmission circuit (100), an outdoor unit that transmits satellite broadcasting received through two central satellite antennas (ANT1, ANT2) used jointly to each subscriber in the public service area, and a reception circuit (200), an indoor unit composed of each subscriber in the public service area.<br><br>Kang at 2:<br><br>Here, the transmission circuit (100) serving as an outdoor unit and the reception circuit (200) serving as an indoor unit are connected by a coaxial cable.<br><br>Kang at 2:<br><br>Here, the matrix (110) includes first and second low noise clocks (Low Noise Block; hereinafter referred to as LNB) (111, 112) connected to the respective antennas (ANT1, |

| Asserted Claims | Kang |
|---|---|
| | ANT2), a power supply unit (113) for supplying 14 V or more of DC, that is, 14 V or 18 V, to the LNBs (111, 112), the first and second dividers (114, 115) that distribute the vertical polarization (V) or horizontal polarization (B) satellite signals output through the first and second LNBs (111, 112) according to the voltage supplied from the power supply unit (113) by the number of subscribers in the public service area, and a predetermined number of switching elements (116, 117) corresponding to the number of subscribers in the public service area that switches the vertical polarization (V) and horizontal polarization (H) satellite signals output from the first and second dividers (114, 115) by control signals (a, b) and output them the tuning unite (120 [] 170).<br><br>Kang at 2:<br><br>That is, when 14 V is supplied to the first LNB (111) from the power supply unit (113), and 18 V is supplied to the second LNB (112), the first LNB (111) outputs only the vertically polarized satellite signal (V), and the second LNB (112) outputs only the horizontally polarized satellite signal (H).<br><br>Kang at 3:<br><br>In this invention configured as described above, when a satellite signal is received through the two central antennas (ANT1, ANT2) used jointly, the power supply unit (113) of the matrix (110) of the transmission circuit (100) supplies 14 V to the first LNB (111) and 18 V to the second LNB (112).<br><br>Kang at 3:<br><br>Accordingly, the first LNB (111) receives only the vertical polarized satellite signal (V), and the second LNB (113) receives only the horizontally polarized satellite signal (H) and outputs it to the divider (114, 115) connected to each output terminal.<br><br>Kang at 3: |

| Asserted Claims | Kang |
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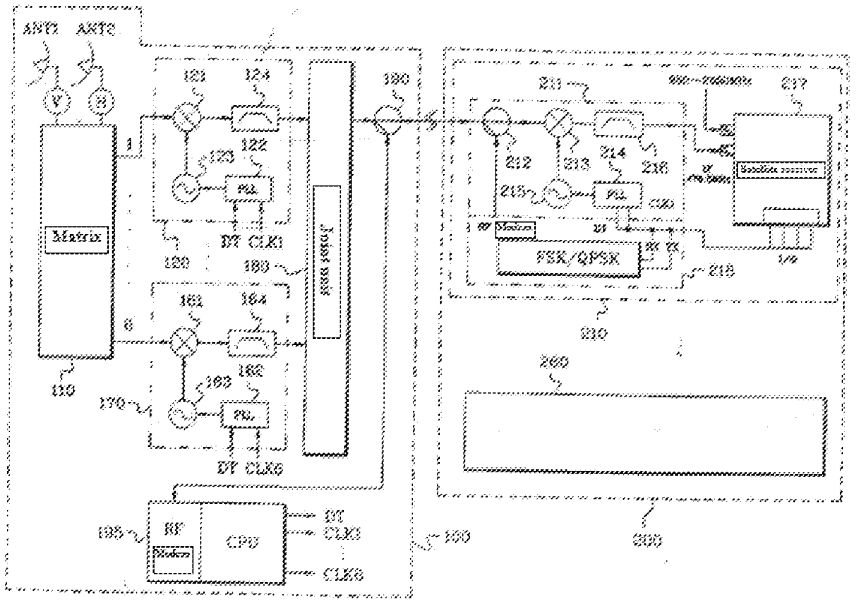
| | At this time, to receive a horizontally polarized satellite signal through the first LNB (111) and a vertical polarized satellite signal through the second LNB (112), 18 V can be supplied from the power supply unit (113) to the first LNB (111) and 14 V to the second LNB (112).<br><br>Kang:<br>  <br><br><br>To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Kang |
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| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Kang discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Kang at 3:<br><br>At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217).<br><br>Kang at 3:<br><br>Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213).<br><br>To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light |

| Asserted Claims | Kang |
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| | of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Kang discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Kang at Abstract:<br><br>A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are |

| Asserted Claims | Kang |
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| | made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system.<br><br>Kang at 1:<br><br>The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver.<br>Kang at 2:<br><br>In Fig. 2, it is composed of a transmission circuit (100), an outdoor unit that transmits satellite broadcasting received through two central satellite antennas (ANT1, ANT2) used jointly to each subscriber in the public service area, and a reception circuit (200), an indoor unit composed of each subscriber in the public service area.<br><br>Kang at 2:<br><br>Here, the transmission circuit (100) serving as an outdoor unit and the reception circuit (200) serving as an indoor unit are connected by a coaxial cable.<br><br>Kang at 2: |

| Asserted Claims | Kang |
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| | At this time, the transmission circuit (100) receives vertical polarization (V) and horizontal polarization (H) satellite broadcasts through two common antenna (ANT1, ANT2), respectively, and then a matrix(110) that distributes satellites signals as many as the number of subscribers is connected to a tuning unit (120 [] 170) that has a unique clock of each subscriber and selects a predetermined channel according to the channel selection data (DT) output from each subscriber.<br><br>Kang at 2:<br><br>Here, the matrix (110) includes first and second low noise clocks (Low Noise Block; hereinafter referred to as LNB) (111, 112) connected to the respective antennas (ANT1, ANT2), a power supply unit (113) for supplying 14 V or more of DC, that is, 14 V or 18 V, to the LNBs (111, 112), the first and second dividers (114, 115) that distribute the vertical polarization (V) or horizontal polarization (B) satellite signals output through the first and second LNBs (111, 112) according to the voltage supplied from the power supply unit (113) by the number of subscribers in the public service area, and a predetermined number of switching elements (116, 117) corresponding to the number of subscribers in the public service area that switches the vertical polarization (V) and horizontal polarization (H) satellite signals output from the first and second dividers (114, 115) by control signals (a, b) and output them the tuning unite (120 [] 170).<br><br>Kang at 2:<br><br>And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). |

| Asserted Claims | Kang |
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| | Kang at 4:<br><br>At this time, taking each subscriber as an example, when the first subscriber of the first subscriber circuit (210) of the reception circuit (200) selects a channel through the satellite receiver (217), the channel data (DT) and the unique clock (CLK1) of the first subscriber are transmitted to the RF modem of the control unit (195) of the reception circuit (100) through the RF modem (210).<br><br>Kang at 4:<br><br>Also, the RF modem of the control unit (195) outputs the channel data (DT) and the unique clock (CLK1) of the first subscriber to the PLL (122) of the tuning unit (120) of the first subscriber, and the PLL (122) maintains a constant signal frequency of the output according to the channel selection data (DT) and the unique clock (CLK1) and outputs the output to the generator (123).<br><br>Kang at 4:<br><br>Here, the generator (123) controlled by I²C generates according to the output of the PLL (122) and outputs a generator frequency to the mixer (121), then the mixer (121) mixes the generator frequency with the vertically or horizontally polarized satellite signal output from the matrix (110) and outputs it to the joint unit (180) through the SAW filter (124).<br><br>Kang at 4:<br><br>In other words, the signal output from the tuning unit (120) is a channel frequency tuned by the first subscriber and is FM-modulated and output in the UHF band.<br><br>Kang at 5: |

| Asserted Claims | Kang |
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| | Meanwhile, when the satellite receiver (217) of the first subscriber circuit (210) selects a channel, the channel selection data is output to the RF modem (218) through the signal input/output terminal (I/O), and the RF modem (218) outputs the channel selection data (DT) and the clock (CLK1) to the control unit (195) of the transmission circuit (100) and the PLL (214) of the first subscriber circuit (210) of the reception circuit (200).<br><br>Kang at 5:<br><br>The PLL (214) maintains a constant output signal frequency according to the channel selection data (DT) and the clock (CLK1) of the first subscriber and outputs it to the generator (215).<br><br>Kang at 5:<br><br>The generator (215) controlled by $I^2C$ generates according to the output of the PLL (214) and outputs a generator frequency to the mixer (213), and the mixer (213) mixes the generator frequency with the satellite signal in the divider (212) and outputs the mix.<br><br>Kang at 5:<br><br>In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213).<br><br>To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Kang |
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| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Kang discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.:*<br><br>Kang at Abstract:<br><br>A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system.<br><br>Kang at 1: |

| Asserted Claims | Kang |
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| | The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver.<br><br>Kang at 2:<br><br>And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121).<br><br>Kang at 3:<br><br>Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each |

| Asserted Claims | Kang |
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| | subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180).<br><br>Kang at 3:<br><br>At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217).<br><br>Kang at 3:<br><br>Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213).<br><br>Kang at 3:<br><br>In this case, the RF modem (218) modulates the signal using Frequency Shift Keying (FSK) or Quad Phase Shift Keying (QPSK). |

| Asserted Claims | Kang |
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| | Kang at 3:<br><br>Here, frequency shift keying is a frequency modulation method in which the transmission data "1" and "0" correspond to two frequencies and the amplitude is constant, and compared to amplitude modulation, it is less susceptible to level fluctuations or noise.<br><br>Kang at 5:<br><br>Furthermore, the UHF-FM signal output from the mixer (213) is converted to a satellite intermediate frequency (e.g. 479.5 MHz) through the SAW filter (216), so that the satellite receiver (217), which is the frequency of the channel selected by the first subscriber, can recognize it, and then output to the satellite receiver (217).<br><br>Kang at 5:<br><br>Similarly, in the second to sixth subscriber circuits, through the same operation as in the first subscriber circuit (210), only the frequency of the channel selected by each subscriber is selected in each subscriber circuit and then converted to a satellite intermediate frequency and output to the satellite receiver of each subscriber circuit.<br><br>To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Kang discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal. |

| Asserted Claims | Kang |
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| | *See, e.g.*:<br><br>Kang at Abstract:<br><br>A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system.<br><br>Kang at 1:<br><br>Furthermore, the frequencies of the modulated predetermined channels are combined in the joint unit (40) and then transmitted through a joint reception system line.<br><br>Kang at 1: |

| Asserted Claims | Kang |
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| | The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver.<br><br>Kang at 3:<br><br>Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180).<br><br>Kang at 5:<br><br>In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213). |

| Asserted Claims | Kang |
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| | To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Kang discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Kang at Abstract:<br><br>A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each |

| Asserted Claims | Kang |
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| | subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system.<br><br>Kang at 1:<br><br>At this time, the satellite signal transmitted through the joint reception system line is amplified by the amplifier (50), then distributed by the divider (60) and input into the TVs in the public service areas (e.g., apartments, hotels, hospitals, buildings, etc.) connected to the joint reception system line.<br><br>Kang at 1:<br><br>Furthermore, the frequencies of the modulated predetermined channels are combined in the joint unit (40) and then transmitted through a joint reception system line.<br><br>Kang at 1:<br><br>The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. |

| Asserted Claims | Kang |
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| | Kang at 2:<br><br>Here, the matrix (110) includes first and second low noise clocks (Low Noise Block; hereinafter referred to as LNB) (111, 112) connected to the respective antennas (ANT1, ANT2), a power supply unit (113) for supplying 14 V or more of DC, that is, 14 V or 18 V, to the LNBs (111, 112), the first and second dividers (114, 115) that distribute the vertical polarization (V) or horizontal polarization (B) satellite signals output through the first and second LNBs (111, 112) according to the voltage supplied from the power supply unit (113) by the number of subscribers in the public service area, and a predetermined number of switching elements (116, 117) corresponding to the number of subscribers in the public service area that switches the vertical polarization (V) and horizontal polarization (H) satellite signals output from the first and second dividers (114, 115) by control signals (a, b) and output them the tuning unite (120 [] 170).<br><br>Kang at 3:<br><br>Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180).<br><br>Kang at 3:<br><br>At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to |

| Asserted Claims | Kang |
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| | the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217).<br><br>Kang at 3:<br><br>Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213).<br><br>Kang at 3:<br><br>Accordingly, the first LNB (111) receives only the vertical polarized satellite signal (V), and the second LNB (113) receives only the horizontally polarized satellite signal (H) and outputs it to the divider (114, 115) connected to each output terminal.<br><br>Kang at 4:<br><br>On the other hand, as the first divider (114) that receives the vertically polarized satellite signal (V) and the second divider (115) that receives the horizontally polarized satellite signal (H) distribute the satellite signal to 6 channels since it is assumed that the number of subscribers in the public service area is 6.<br><br>Kang at 4: |

| Asserted Claims | Kang |
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| | The joint unit (180) outputs the satellite frequency of the tuned channel to each of the subscriber circuits (210, 260) of the reception circuit (200) through the divider (190).<br><br>Kang at 4:<br><br>In this case, taking the first subscriber as an example, when an error occurs in the first subscriber circuit (210) of the RF modem (218) of the tuning unit (211) of the first subscriber circuit (210), the error is transmitted, and when a channel is selected, the channel selection data (DT) is transmitted to the RF modem of the control unit (195) of the transmission circuit (100) through the divider (212) together with the first subscriber's unique clock (CLK1).<br><br>Kang at 4:<br><br>In other words, it is a bidirectional coaxial cable that, when the divider (212) receives a satellite signal from the transmission circuit (100) or when an error occurs in the first subscriber circuit (210), outputs the error, and outputs the channel data to the control unit (195) of the transmission circuit (100) together with a unique clock (CLK1) when a channel is selected.<br><br>Kang at 4:<br><br>Accordingly, the FM-modulated satellite signal in the UHF band received through the divider (212) is output to the mixer (213).<br><br>Kang at 5:<br><br>The generator (215) controlled by I²C generates according to the output of the PLL (214) and outputs a generator frequency to the mixer (213), and the mixer (213) mixes the generator frequency with the satellite signal in the divider (212) and outputs the mix. |

| Asserted Claims | Kang |
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| | Kang at 5:<br><br>In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213).<br><br>To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Kang discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>*See, e.g.*:<br><br>Kang at Abstract:<br><br>A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after |

| Asserted Claims | Kang |
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| | selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system.<br><br>Kang at 1:<br><br>The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver.<br><br>Kang at 2: |

| Asserted Claims | Kang |
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| | At this time, the transmission circuit (100) receives vertical polarization (V) and horizontal polarization (H) satellite broadcasts through two common antenna (ANT1, ANT2), respectively, and then a matrix(110) that distributes satellites signals as many as the number of subscribers is connected to a tuning unit (120 [] 170) that has a unique clock of each subscriber and selects a predetermined channel according to the channel selection data (DT) output from each subscriber.<br><br>Kang at 2:<br><br>And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121).<br><br>Kang at 3:<br><br>In addition, the transmission circuit (100) is provided with a control unit (195) for outputting channel selection data (DT) output from each subscriber, a unique clock (CLK1 [] CLK6) and error data to the tuning units (120 [] 170) through bidirectional communication with the reception circuit (200).<br><br>Kang at 3:<br><br>At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite |

| Asserted Claims | Kang |
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| | receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217).<br><br>Kang at 3:<br><br>Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213).<br><br>Kang at 4:<br><br>At this time, taking each subscriber as an example, when the first subscriber of the first subscriber circuit (210) of the reception circuit (200) selects a channel through the satellite receiver (217), the channel data (DT) and the unique clock (CLK1) of the first subscriber are transmitted to the RF modem of the control unit (195) of the reception circuit (100) through the RF modem (210).<br><br>Kang at 4:<br><br>Also, the RF modem of the control unit (195) outputs the channel data (DT) and the unique clock (CLK1) of the first subscriber to the PLL (122) of the tuning unit (120) of the first subscriber, and the PLL (122) maintains a constant signal frequency of the output |

| Asserted Claims | Kang |
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| | according to the channel selection data (DT) and the unique clock (CLK1) and outputs the output to the generator (123).<br><br>Kang at 4:<br><br>In this case, taking the first subscriber as an example, when an error occurs in the first subscriber circuit (210) of the RF modem (218) of the tuning unit (211) of the first subscriber circuit (210), the error is transmitted, and when a channel is selected, the channel selection data (DT) is transmitted to the RF modem of the control unit (195) of the transmission circuit (100) through the divider (212) together with the first subscriber's unique clock (CLK1).<br><br>Kang at 5:<br><br>Meanwhile, when the satellite receiver (217) of the first subscriber circuit (210) selects a channel, the channel selection data is output to the RF modem (218) through the signal input/output terminal (I/O), and the RF modem (218) outputs the channel selection data (DT) and the clock (CLK1) to the control unit (195) of the transmission circuit (100) and the PLL (214) of the first subscriber circuit (210) of the reception circuit (200).<br><br>Kang at 5:<br><br>The PLL (214) maintains a constant output signal frequency according to the channel selection data (DT) and the clock (CLK1) of the first subscriber and outputs it to the generator (215).<br><br>Kang at 5:<br><br>In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the |

| Asserted Claims | Kang |
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| | first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213).<br><br>To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Kang discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Kang at Abstract:<br><br>A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate |

| Asserted Claims | Kang |
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| | frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system.<br><br>Kang at 1:<br><br>The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver.<br><br>Kang at 2:<br><br>At this time, the transmission circuit (100) receives vertical polarization (V) and horizontal polarization (H) satellite broadcasts through two common antenna (ANT1, ANT2), respectively, and then a matrix(110) that distributes satellites signals as many as the number of subscribers is connected to a tuning unit (120 [] 170) that has a unique clock of |

| Asserted Claims | Kang |
|---|---|
| | each subscriber and selects a predetermined channel according to the channel selection data (DT) output from each subscriber.<br><br>Kang at 2:<br><br>And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121).<br><br>Kang at 3:<br><br>In addition, the transmission circuit (100) is provided with a control unit (195) for outputting channel selection data (DT) output from each subscriber, a unique clock (CLK1 [] CLK6) and error data to the tuning units (120 [] 170) through bidirectional communication with the reception circuit (200).<br><br>Kang at 3:<br><br>At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217). |

| Asserted Claims | Kang |
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| | Kang at 3:<br><br>Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213).<br><br>Kang at 4:<br><br>At this time, taking each subscriber as an example, when the first subscriber of the first subscriber circuit (210) of the reception circuit (200) selects a channel through the satellite receiver (217), the channel data (DT) and the unique clock (CLK1) of the first subscriber are transmitted to the RF modem of the control unit (195) of the reception circuit (100) through the RF modem (210).<br><br>Kang at 4:<br><br>Also, the RF modem of the control unit (195) outputs the channel data (DT) and the unique clock (CLK1) of the first subscriber to the PLL (122) of the tuning unit (120) of the first subscriber, and the PLL (122) maintains a constant signal frequency of the output according to the channel selection data (DT) and the unique clock (CLK1) and outputs the output to the generator (123).<br><br>Kang at 4: |

| Asserted Claims | Kang |
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| | In this case, taking the first subscriber as an example, when an error occurs in the first subscriber circuit (210) of the RF modem (218) of the tuning unit (211) of the first subscriber circuit (210), the error is transmitted, and when a channel is selected, the channel selection data (DT) is transmitted to the RF modem of the control unit (195) of the transmission circuit (100) through the divider (212) together with the first subscriber's unique clock (CLK1).<br><br>Kang at 5:<br><br>Meanwhile, when the satellite receiver (217) of the first subscriber circuit (210) selects a channel, the channel selection data is output to the RF modem (218) through the signal input/output terminal (I/O), and the RF modem (218) outputs the channel selection data (DT) and the clock (CLK1) to the control unit (195) of the transmission circuit (100) and the PLL (214) of the first subscriber circuit (210) of the reception circuit (200).<br><br>Kang at 5:<br><br>The PLL (214) maintains a constant output signal frequency according to the channel selection data (DT) and the clock (CLK1) of the first subscriber and outputs it to the generator (215).<br><br>Kang at 5:<br><br>In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213).<br><br>To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art |

| Asserted Claims | Kang |
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| | references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Kang discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Kang at Abstract:<br><br>A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are |

| Asserted Claims | Kang |
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| | made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system.<br><br>Kang at 1:<br><br>The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver.<br><br>Kang at 2:<br><br>At this time, the transmission circuit (100) receives vertical polarization (V) and horizontal polarization (H) satellite broadcasts through two common antenna (ANT1, ANT2), respectively, and then a matrix(110) that distributes satellites signals as many as the number of subscribers is connected to a tuning unit (120 [] 170) that has a unique clock of each subscriber and selects a predetermined channel according to the channel selection data (DT) output from each subscriber.<br><br>Kang at 2: |

| Asserted Claims | Kang |
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| | And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121).<br><br>Kang at 3:<br><br>In addition, the transmission circuit (100) is provided with a control unit (195) for outputting channel selection data (DT) output from each subscriber, a unique clock (CLK1 [] CLK6) and error data to the tuning units (120 [] 170) through bidirectional communication with the reception circuit (200).<br><br>Kang at 3:<br><br>At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217).<br><br>Kang at 3:<br><br>Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a |

| Asserted Claims | Kang |
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| | mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213).<br><br>Kang at 4:<br><br>At this time, taking each subscriber as an example, when the first subscriber of the first subscriber circuit (210) of the reception circuit (200) selects a channel through the satellite receiver (217), the channel data (DT) and the unique clock (CLK1) of the first subscriber are transmitted to the RF modem of the control unit (195) of the reception circuit (100) through the RF modem (210).<br><br>Kang at 4:<br><br>Also, the RF modem of the control unit (195) outputs the channel data (DT) and the unique clock (CLK1) of the first subscriber to the PLL (122) of the tuning unit (120) of the first subscriber, and the PLL (122) maintains a constant signal frequency of the output according to the channel selection data (DT) and the unique clock (CLK1) and outputs the output to the generator (123).<br><br>Kang at 4:<br><br>In this case, taking the first subscriber as an example, when an error occurs in the first subscriber circuit (210) of the RF modem (218) of the tuning unit (211) of the first subscriber circuit (210), the error is transmitted, and when a channel is selected, the channel selection data (DT) is transmitted to the RF modem of the control unit (195) of the |

| Asserted Claims | Kang |
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| | transmission circuit (100) through the divider (212) together with the first subscriber's unique clock (CLK1).<br><br>Kang at 5:<br><br>Meanwhile, when the satellite receiver (217) of the first subscriber circuit (210) selects a channel, the channel selection data is output to the RF modem (218) through the signal input/output terminal (I/O), and the RF modem (218) outputs the channel selection data (DT) and the clock (CLK1) to the control unit (195) of the transmission circuit (100) and the PLL (214) of the first subscriber circuit (210) of the reception circuit (200).<br><br>Kang at 5:<br><br>The PLL (214) maintains a constant output signal frequency according to the channel selection data (DT) and the clock (CLK1) of the first subscriber and outputs it to the generator (215).<br><br>Kang at 5:<br><br>In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213).<br><br>To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

**Exhibit B9 – Mutzig Invalidity Claim Chart**

## INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Mutzig

U.S. Patent No. 5,276,904 ("Mutzig") issued on January 4, 1994. Mutzig therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a), (b) and/or (e). For the reasons listed below, Mutzig invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Mutzig |
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| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Mutzig discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Mutzig at 2:55-58:<br><br>In this figure, as in all of the others except for FIGS. 8 and 9, the vertical dotted line separates the external unit, to the left of the figure, from the internal unit, to the right. |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Mutzig |
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| | Mutzig at 3:58-4:4:<br><br>The invention proposes a solution to the multiplication of converters in the external unit and of the link cables to the internal unit, by adapting a microwave frequency head, located in an external unit, integrated with the antenna for example. This receiving head comprises a multi-band converter, operating at a frequency which is programmed by control from the internal unit and a single receiving head can then process 20 to 40 channels. But furthermore, the received signals are demodulated and processed on the spot by the microwave head which supplies signals which are remodulated in amplitude modulation, which allows them to be applied to the multiplexer of VHF-UHF terrestrial microwave link receiving antennas, and the use of the existing single, 40-860 MHz link cable.<br><br>Mutzig at 4:13-20:<br><br>More precisely, the invention comprises a system for receiving TV signals retransmitted by satellites, intended for the transmission of at least one channel from among a plurality of channels from at least one antenna, in an external unit, to at least one receiver in an internal unit, this system being characterized in that it comprises, in an external unit, a microwave frequency head which comprises at least:<br><br>Mutzig at 4:57-5:7:<br><br>FIG. 3 shows the system for receiving signals retransmitted by satellites according to the invention. The external unit for receiving terrestrial signals comprising the VHF/UHF antennas 1, the multiplexer 2 and the link cable 3 to the internal unit is assumed to already exist, because it is the most common case. If this is not the case, it suffices to install a conventional link cable 3, adapted to 40-860 MHz amplitude modulated signals. This system of receiving satellite signals is based on a microwave frequency head 23, interposed between the parabolic antenna or antennas 7 and 10, and the multiplexer 2 of the existing installation. The number and type of the parabolic antennas does not limit the extent of the invention and, if there is no multiplexer 2, the link cable 3 is connected directly to the |

| Asserted Claims | Mutzig |
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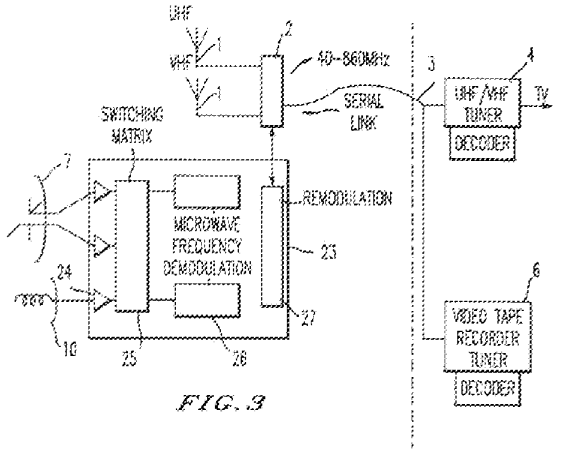
| | microwave frequency head since one of its purposes is to process the satellite signals in order to make them compatible with the terrestrial signals and pass through the same cable.<br><br>Mutzig at Fig. 3:<br><br>  <br><br>FIG. 3<br><br>Mutzig at 5:8-32:<br><br>The structure of the microwave frequency head 23, which will be described in detail below comprises: a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the polarization of the signal, a switching matrix allowing the selection of the channel or channels chosen from among those transmitted by the satellite or satellites; this matrix allows the choice of the program from several simultaneously transmitted channels, at least two microwave frequency demodulators 26, a remodulation circuit 27, which converts the FM modulated signals in baseband, 0-6 MHz for example coming from demodulators 26, into amplitude modulated signals in the 40-860 MHz band a 40-860 MHz downward link |

| Asserted Claims | Mutzig |
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| | to the internal unit, an upward link using the same physical medium 3-28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally.<br><br>Mutzig at 5:39-45:<br><br>On the contrary, FIG. 4 shows the advantage of the microwave frequency head according to the invention for simultaneously using a large number of channels transmitted by satellites. The number of amplifiers 24 is adapted to the number and to the types of parabolic antennas 7, 10, 29 and to the number of corresponding channels.<br>Mutzig at Fig. 4: |

| Asserted Claims | Mutzig |
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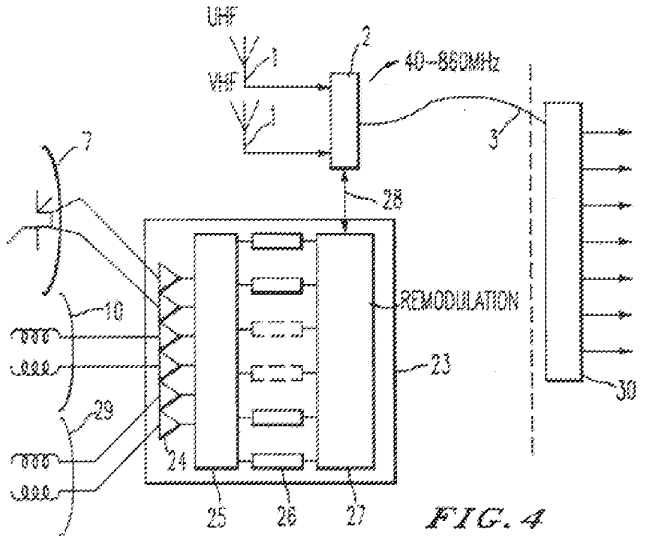
| |  <br>FIG. 4<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Mutzig discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Mutzig at 6:5-13: |

| Asserted Claims | Mutzig |
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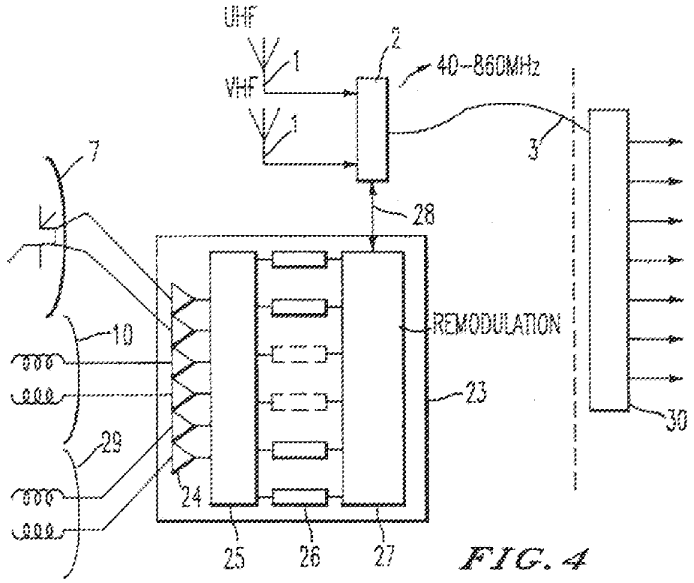
| | The output signals from the head all use the single link cable 3, and are applied by the distributor 30, in the internal unit, to the various receiving devices, either television or telecommunications, each of which decodes the information corresponding to a channel. By way of example, the microwave frequency head according to the invention allows the simultaneous use of up to 20 to 40 channels, in collective reception for a building or a telecommunications center.<br><br>Mutzig at Fig. 4:<br><br>  <br><br>FIG. 4<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior |

| Asserted Claims | Mutzig |
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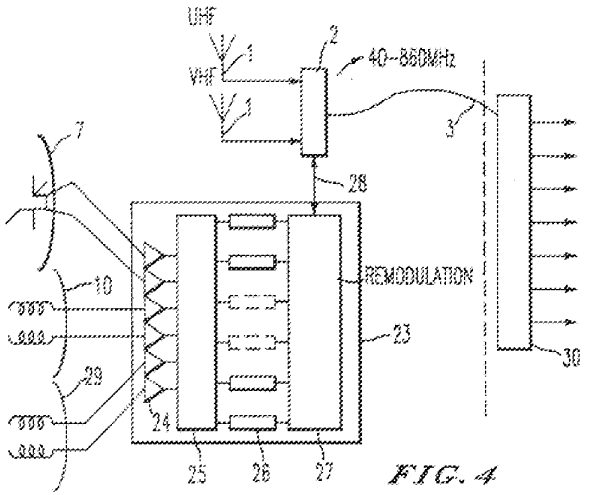
| | art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Mutzig discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Mutzig at 4:14-20:<br><br>More precisely, the invention comprises a system for receiving TV signals retransmitted by satellites, intended for the transmission of at least one channel from among a plurality of channels from at least one antenna, in an external unit, to at least one receiver in an internal unit, this system being characterized in that it comprises, in an external unit, a microwave frequency head which comprises at least:<br><br>Mutzig at 5:10-13:<br><br>a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the polarization of the signal,<br><br>Mutzig at 5:25-31:<br><br>an upward link using the same physical medium 3+28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally. |

| Asserted Claims | Mutzig |
|---|---|
| | Mutzig at Fig. 4:<br>  <br><br>FIG. 4<br><br>Mutzig at 5:47-55:<br><br>But in this case, the switching matrix 25 of FIG. 3 is replaced by a power distributor 25' which transmits all of the channels to a plurality of microwave frequency demodulators 26. This constitutes a solution for the collective service of a building, by means of which a large number of users can each receive a different channel, since all of the channels are demodulated simultaneously. This service is known by the abbreviation SMATV, standing for "Satellite Master Antenna TV".<br><br>Mutzig at 6:43-52:<br><br>The converter and the RF/IF module are both controlled from a quartz crystal 37 which, via a synthesizer 38, controls an oscillator 39. The synthesizer 38 is an assembly which is |

| Asserted Claims | Mutzig |
|---|---|
| | known and available on the market 50 55 65 and is controlled on its input 40 by digital data transmit ted by the link cable 3, and it allows the selection of a channel, or of N channels from among M channels, by choosing an appropriate frequency. The oscillator 39 directly controls the mixer 34, of the RF/IF module, for example at 2.3 GHz.<br><br>Mutzig at 8:28-36:<br><br>But a regulated power supply 54 injects a DC current, Smoothed by the LC element 55, onto this same cable 3; the digital data necessary for programming the microwave frequency head according to the invention, coming from the internal unit, are applied to a shaping circuit 56 and then to a multiplexing circuit 57, which distributes them to the switching matrix 25, to the direct demodulation converters 26 and to the MABLR remodulator 27.<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Mutzig discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Mutzig at 6:29-35:<br><br>The converter comprises a low noise input amplifier 31 which receives the signals from the antenna 7, a mixer 32 and an output amplifier 33. The converter is controlled by a multi-band oscillator which will be described later. This converter allows the conversion of the entire frequency band of a satellite into a frequency range of 0.95 to 1.70 GHz. |

| Asserted Claims | Mutzig |
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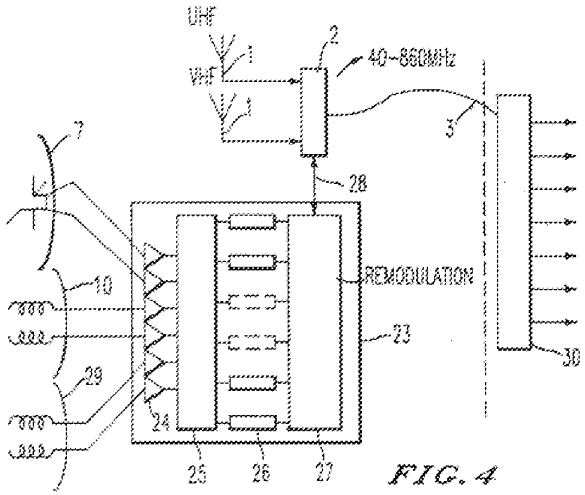
| | Mutzig at 7:27-41:<br><br>It is therefore an advantage of the invention that the signal is remodulated, as shown in FIG. 7. The modulator 48 receives the signal in base band, 0-6MHz, coming from the filter 47, and applies residual side band amplitude modulation (MABLR) to it and it sends, through the link cable 3, signals at 40-860 MHz which are insensitive to interference. This allows the system to be compatible with the existing standard links since the microwave frequency head according to the invention supplies amplitude modulated signals in the 40-860 MHz band, like the conventional VHF-UHF antennas. Furthermore, in the case of a simultaneous reception a single link suffices for transmitting several programs, in 8 MHz steps for example.<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Mutzig discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Mutzig at 4:14-20:<br><br>More precisely, the invention comprises a system for receiving TV signals retransmitted by satellites, intended for the transmission of at least one channel from among a plurality of channels from at least one antenna, in an external unit, to at least one receiver in an internal unit, this system being characterized in that it comprises, in an external unit, a microwave frequency head which comprises at least: |

**Exhibit B9 – Mutzig Invalidity Claim Chart**

| Asserted Claims | Mutzig |
|---|---|
| | Mutzig at 5:10-13:<br><br>a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the polarization of the signal,<br><br>Mutzig at 5:25-31:<br><br>an upward link using the same physical medium 3+28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally.<br><br>Mutzig at Fig. 4: |

| Asserted Claims | Mutzig |
|---|---|
| |  <br>FIG. 4<br><br>Mutzig at 5:47-55:<br><br>But in this case, the switching matrix 25 of FIG. 3 is replaced by a power distributor 25' which transmits all of the channels to a plurality of microwave frequency demodulators 26. This constitutes a solution for the collective service of a building, by means of which a large number of users can each receive a different channel, since all of the channels are demodulated simultaneously. This service is known by the abbreviation SMATV, standing for "Satellite Master Antenna TV".<br><br>Mutzig at 6:14-19:<br><br>The heart of the system is in the microwave frequency demodulator, the function of which is to select a channel and to demodulate the frequency modulated microwave frequency signal, complying with the characteristics required by the standards, that is, rejection of adjacent channels, linearity . . . etc. |

| Asserted Claims | Mutzig |
|---|---|
| | Mutzig at 6:43-52:<br><br>The converter and the RF/IF module are both controlled from a quartz crystal 37 which, via a synthesizer 38, controls an oscillator 39. The synthesizer 38 is an assembly which is known and available on the market 50 55 65 and is controlled on its input 40 by digital data transmit ted by the link cable 3, and it allows the selection of a channel, or of N channels from among M channels, by choosing an appropriate frequency. The oscillator 39 directly controls the mixer 34, of the RF/IF module, for example at 2.3 GHz.<br><br>Mutzig at 8:28-36:<br><br>But a regulated power supply 54 injects a DC current, Smoothed by the LC element 55, onto this same cable 3; the digital data necessary for programming the microwave frequency head according to the invention, coming from the internal unit, are applied to a shaping circuit 56 and then to a multiplexing circuit 57, which distributes them to the switching matrix 25, to the direct demodulation converters 26 and to the MABLR remodulator 27.<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific | Mutzig discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*: |

| Asserted Claims | Mutzig |
|---|---|
| programs, and distributes the programs over a digital local area network (LAN) to STBs. | Mutzig at 8:38-55:<br><br>An advantage of the microwave frequency head according to the invention is that it processes the signals retransmitted by different satellites and routes them through a 40-860 MHz downward link which is none other than the existing VHF/UHF antenna cable. This is due to the remodulation in MABLR amplitude modulation. However, the microwave frequency head can also be used with receivers fitted with a "satellite" input which receives the signals in the satellite intermediate band 950-1700 MHz. In this case, it suffices to eliminate the FM demodulation, which is carried out by means of a switch in the link 46, and to output before the MABLR remodulation. But in this case the downward link must pass the 40-1700 MHz band. The programming of the microwave frequency head is of course adapted to allow the remote control either of the demodulation of a channel, or of the conversion into satellite intermediate band.<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Mutzig discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Mutzig |
|---|---|
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Mutzig discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Mutzig discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

# INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Oishi

U.S. Patent No. 7,263,713 ("Oishi") was filed on February 26, 2001 and issued on August 28, 2007. Oishi issued from U.S. Patent Application Pub. No. 2002/0056140, which was published on May 9, 2002. Oishi therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(e).[2] For the reasons listed below, Oishi invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Oishi |
|---|---|
| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Oishi discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

[2] In the event Plaintiff cannot claim the benefit of the priority date of the provisional applications, the Oishi patent application would also qualify as prior art under (pre-AIA) 35 U.S.C. § 102(a).

| Asserted Claims | Oishi |
|---|---|
| | Oishi at 1:9–19:<br><br>The present invention generally relates to television signal distributor apparatuses, receiver apparatuses, and television signal transmission systems and methods. More specifically, the present invention relates to a television signal distributor apparatus, a receiver apparatus, a television signal transmission system and method, which are particularly suitable for implementing a small-scale television signal distribution network in which television signals received via a master antenna provided on the rooftop at collective housing, such as an apartment building, are delivered to each household via a cable.<br><br>Oishi at 3:22–30:<br><br>Accordingly, it is an object of the present invention to provide a television signal distribution apparatus, a receiver apparatus, and a television signal transmission system and method, which allows, without implementing large-scale works, terrestrial broadcasting signals in the VHF and UHF bands, the BS intermediate frequency signals, and CS intermediate frequency signals of a CS broadcasting service which employs two or more satellites to be multiplexed for transmission to each household via a single cable.<br><br>Oishi at 3:31–53:<br><br>To this end, the present invention provides a television signal transmission system including a television signal distributor apparatus which delivers signals received via a master antenna to each household via a cable; and at least one receiver apparatus provided in each household. The television signal distributor apparatus includes a modulation format converting unit for converting the modulation format of received CS broadcast signals to thereby accommodate the signals in a narrower bandwidth, and for frequency-shifting the signals accommodated in the narrower bandwidth into a vacant frequency band; and a mixing unit for mixing for transmission via the cable the frequency-shifted signals accommodated in said narrower bandwidth with other type or types of received broadcast signals. The at least one receiver apparatus includes a receiving unit for receiving CS broadcast signals which have undergone conversion of modulation format so as to be |

| Asserted Claims | Oishi |
|---|---|
| | accommodated in a narrower bandwidth and which have then been frequency-shifted into a vacant frequency band; a demodulating unit for demodulating the received signals in accordance with the modulation format after conversion; and a decoding unit for decoding the output from the demodulating unit to obtain video signals and audio signals.<br><br>Oishi at 3:54–4:3:<br><br>In accordance with the present invention, the modulation format of CS intermediate frequency signals is converted, for example, from QPSK to 64-QAM; thus, CS broadcasting signals from each transponder, having a bandwidth of, for example, 27 MHz, are accommodated in a bandwidth of, for example, 6 MHz, which is equivalent to a single channel for terrestrial broadcasting. The CS signals which have undergone conversion of the modulation format are frequency-shifted into a vacant channel in the VHF band or the UHF band. The frequency-shifted CS signals are multiplexed with BS intermediate frequency signals and terrestrial broadcasting signals for transmission to each household via a single cable. Accordingly, signals for a CS broadcasting service, even if provided via two or more satellites, can be transmitted to each household via a single cable together with signals for a BS broadcasting service and terrestrial broadcasting signals.<br><br>Oishi at 4:57–5:9:<br><br>FIG. 3 shows the frequency allocation of signals transmitted via a cable. Referring to FIG. 3, A 1 (90 MHz to 108 MHz) is the VHF low band, A2 (108 MHz to 170 MHz) is the VHF mid band, A3 (170 MHz to 222 MHz) is the VHF high band, A4 (222 MHz to 470 MHz) is the VHF super high band, A5 (470 MHz to 770 MHz) is the UHF band, and A6 (1035 MHz to 1335 MHz) is a band for intermediate frequency signals of BS broadcasting signals. Currently, the VHF low band A1 and the VHF high band A3 are used for VHF terrestrial television broadcasting, and the UHF band A5 is used for UHF terrestrial television broadcasting. The VHF mid band A2 and the VHF super high band A4 are allocated for CATV (Cable Television); and therefore, the bands are vacant where CATV service is not used. The BS broadcasting signals are broadcast on electromagnetic waves in the 12-GHz band. When received via a parabola antenna, the BS broadcasting signals are |

| Asserted Claims | Oishi |
|---|---|
| | converted into intermediate frequency signals in the 1-GHz band in an LNB (Low Noise Block Down Converter) provided in association with the parabola antenna.<br><br>Oishi at 5:10–32:<br><br>CS broadcasting signals are also broadcast on electromagnetic waves in the 12-GHz band, and include vertically polarized signals and horizontally polarized signals. In the case of a CS service which employs two satellites, signals from one satellite and signals from the other respectively includes vertical polarization signals and horizontal polarization signals. For example, the Japanese SKY PerfecTV employs two satellites for its broadcasting service, and signals from each of the two satellites includes vertically polarized signals and horizontally polarized signals. The CS broadcasting signals in the 12-GHz band are converted into intermediate frequency signals in the 1-GHz band in an LNB provided in association with a parabola antenna. In order to accommodate the CS broadcasting signals, there are provided four bands B 1, B2, B3, and B4 corresponding to vertically polarized signals and horizontally polarized signals from each of the two satellites. The bands B1 to B4 overlap the band A6 for intermediate frequency signals of BS broadcasting signals. Thus, it is not feasible to simply mix CS intermediate frequency signals, BS intermediate frequency signals, and terrestrial television broadcasting signals in the VHF and UHF bands and to deliver all these signals to each household via a single cable.<br><br>Oishi at 6:28–34:<br><br>The CS parabola antennas 1A and 1B receive signals transmitted from two communications satellites 8A and 8B. The parabola antennas 1A and 1B are provided with LNBs 9A and 9B, respectively. The LNBs 9A and 9B converts CS broadcasting signals in the 12-GHz band into intermediate frequency signals. The outputs of the LNBs 9A and 9B are fed to a modulation format conversion unit 4.<br><br>Oishi at 6:43–48:<br><br>The BS parabola antenna 2 receives signals from a broadcasting satellite 6. The parabola antenna 2 is provided with an LNB 7. The LNB 7 converts signals in the 12-GHz band |

| Asserted Claims | Oishi |
|---|---|
| | received by the parabola antenna 2 into intermediate frequency signals in the 1-GHz band. The output of the LNB 7 is fed to the mixer 5.<br><br>Oishi at 6:49–51:<br><br>The antennas 3A and 3B receive terrestrial broadcasting signals in the VHF and UHF bands. The outputs of the antennas 3A and 3B are fed to the mixer 5.<br><br>Oishi at 6:52–54:<br><br>The mixer 5 mixes the output from the modulation format conversion unit 4, the output from the LNB 7, and the output from the antennas 3A and 3B.<br><br>Oishi at 7:43–50:<br><br>FIG. 5 shows the construction of the modulation format conversion unit 4. As described above, the modulation format conversion unit 4 receives CS intermediate frequency signals from the LNBs 9A and 9B provided in association with the parabola antennas 1A and 1B, converts the modulation format of the CS intermediate frequency signals from QPSK to 64-QAM, and frequency-shifts the signals into a vacant channel in the VHF band or the UHF band.<br><br>Oishi at 7:60–65:<br><br>Referring to FIG. 5, CS intermediate frequency signals output from the LNBs 9A and 9B of the parabola antennas 1A and 1B are fed to an input terminal 21. The signals input to the input terminal 21 are fed to each tuner circuit 22 of the modulation circuit 4A, 4B, 4C, etc. The tuner circuit 22 selects signals on a desired carrier wave.<br><br>Oishi at Fig. 4: |

| Asserted Claims | Oishi |
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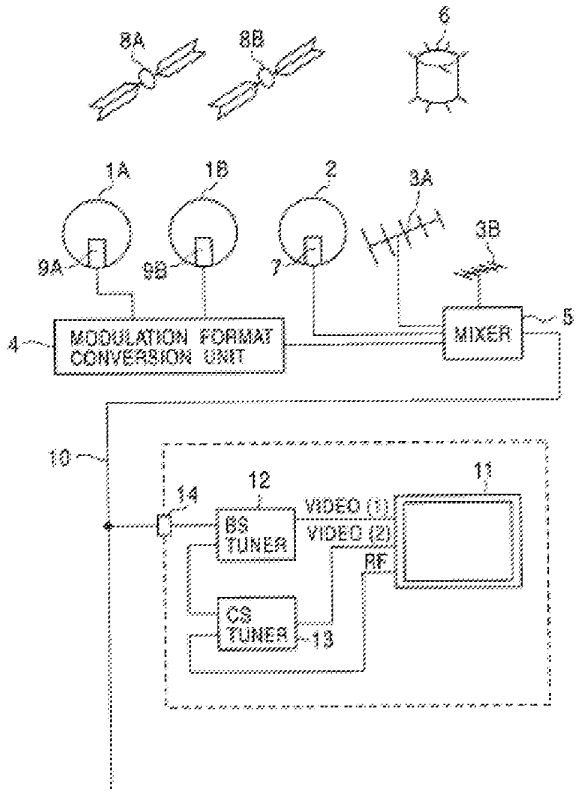
| | FIG. 4<br>  <br><br>To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Oishi |
|---|---|
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Oishi discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Oishi at 3:22–30:<br><br>Accordingly, it is an object of the present invention to provide a television signal distribution apparatus, a receiver apparatus, and a television signal transmission system and method, which allows, without implementing large-scale works, terrestrial broadcasting signals in the VHF and UHF bands, the BS intermediate frequency signals, and CS intermediate frequency signals of a CS broadcasting service which employs two or more satellites to be multiplexed for transmission to each household via a single cable.<br><br>Oishi at 3:31–53:<br><br>To this end, the present invention provides a television signal transmission system including a television signal distributor apparatus which delivers signals received via a master antenna to each household via a cable; and at least one receiver apparatus provided in each household. The television signal distributor apparatus includes a modulation format converting unit for converting the modulation format of received CS broadcast signals to thereby accommodate the signals in a narrower bandwidth, and for frequency-shifting the signals accommodated in the narrower bandwidth into a vacant frequency band; and a mixing unit for mixing for transmission via the cable the frequency-shifted signals accommodated in said narrower bandwidth with other type or types of received broadcast signals. The at least one receiver apparatus includes a receiving unit for receiving CS broadcast signals which have undergone conversion of modulation format so as to be accommodated in a narrower bandwidth and which have then been frequency-shifted into a vacant frequency band; a demodulating unit for demodulating the received signals in |

| Asserted Claims | Oishi |
|---|---|
| | accordance with the modulation format after conversion; and a decoding unit for decoding the output from the demodulating unit to obtain video signals and audio signals.<br><br>Oishi at 7:10–12:<br><br>The terrestrial broadcasting signals are fed from the terminal 14, through the BS tuner 12 and the CS tuner 13, to an RF input terminal of the television receiver 11.<br><br>To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Oishi discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Oishi at 1:9–19:<br><br>The present invention generally relates to television signal distributor apparatuses, receiver apparatuses, and television signal transmission systems and methods. More specifically, the present invention relates to a television signal distributor apparatus, a receiver apparatus, a television signal transmission system and method, which are particularly suitable for implementing a small-scale television signal distribution network in which television signals received via a master antenna provided on the rooftop at collective housing, such as an apartment building, are delivered to each household via a cable. |

| Asserted Claims | Oishi |
|---|---|
| | Oishi at 3:22–30:<br><br>Accordingly, it is an object of the present invention to provide a television signal distribution apparatus, a receiver apparatus, and a television signal transmission system and method, which allows, without implementing large-scale works, terrestrial broadcasting signals in the VHF and UHF bands, the BS intermediate frequency signals, and CS intermediate frequency signals of a CS broadcasting service which employs two or more satellites to be multiplexed for transmission to each household via a single cable.<br><br>Oishi at 3:31–53:<br><br>To this end, the present invention provides a television signal transmission system including a television signal distributor apparatus which delivers signals received via a master antenna to each household via a cable; and at least one receiver apparatus provided in each household. The television signal distributor apparatus includes a modulation format converting unit for converting the modulation format of received CS broadcast signals to thereby accommodate the signals in a narrower bandwidth, and for frequency-shifting the signals accommodated in the narrower bandwidth into a vacant frequency band; and a mixing unit for mixing for transmission via the cable the frequency-shifted signals accommodated in said narrower bandwidth with other type or types of received broadcast signals. The at least one receiver apparatus includes a receiving unit for receiving CS broadcast signals which have undergone conversion of modulation format so as to be accommodated in a narrower bandwidth and which have then been frequency-shifted into a vacant frequency band; a demodulating unit for demodulating the received signals in accordance with the modulation format after conversion; and a decoding unit for decoding the output from the demodulating unit to obtain video signals and audio signals.<br><br>Oishi at 4:45–56:<br><br>In accordance with the present invention, CS broadcasting signals from each transponder received via a master antenna undergo conversion of the modulation format so that the signals are accommodated in a narrower bandwidth. The signals accommodated in the |

| Asserted Claims | Oishi |
|---|---|
| | narrower bandwidth are then frequency-shifted into a vacant channel in the VHF band or the UHF band. This eliminates the need to provide an additional band for the CS broadcasting signals; thus, the CS broadcasting signals, even if serviced by two or more satellites, can be delivered to each household via a single cable together with terrestrial television broadcasting signals and BS broadcasting signals.<br><br>Oishi at 6:57–60:<br><br>Each household is provided with a television receiver 11, a BS tuner 12, and a CS tuner 13 compatible with the television signal transmission system. The television receiver 11 has two external video/audio input terminals.<br><br>Oishi at 6:61–67:<br><br>Of the signals transmitted via the cable 10, the BS intermediate frequency signals are fed to the BS tuner 12 via the terminal 14. The BS tuner 12 demodulates the BS intermediate frequency signals to obtain video signals and audio signals, for example, in the NTSC format. The output of the BS tuner 12 is fed to one of the external video/audio input terminals Video(1) of the television receiver 11.<br><br>Oishi at 7:1–9:<br><br>The CS intermediate frequency signals which have undergone conversion of the modulation format and which have been frequency-shifted are fed from the terminal 14 via an RF through circuit and a distributor circuit of the BS tuner 12 to the CS tuner 13. The CS tuner 13 demodulates the CS intermediate frequency signals to obtain video signals and audio signals, for example, in the NTSC format. The output of the CS tuner 12 is fed to the other external video/audio input terminal Video(2) of the television receiver 11.<br><br>Oishi at 7:10–12: |

| Asserted Claims | Oishi |
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| | The terrestrial broadcasting signals are fed from the terminal 14, through the BS tuner 12 and the CS tuner 13, to an RF input terminal of the television receiver 11.<br><br>Oishi at 7:13–23:<br><br>As described above, in the television signal transmission system shown in FIG. 4, the modulation format conversion unit 4 converts the modulation format of the CS intermediate frequency signals so as to accommodate the signals in a narrower bandwidth, and frequency-shifts the signals into a vacant band in the VHF band or in the UHF band. Then, the output of the modulation format conversion unit 4 is multiplexed in the mixer 5 with the BS intermediate frequency signals and terrestrial broadcasting signals in the VHF and UHF bands, so that the mixed signals are transmitted to each household via the cable 10.<br><br>Oishi at 7:24–33:<br><br>In each household, the BS tuner 12 demodulates the BS intermediate frequency signals, and outputs corresponding video and audio signals to the external video/audio input terminal Video(1) of the television receiver 11. The CS tuner 13 decodes the CS intermediate frequency signals and outputs corresponding video and audio signals to the external video/audio input terminal Video(2) of the television receiver 11. The terrestrial broadcasting signals in the VHF and UHF bands are input to the RF input terminal of the television receiver 11.<br><br>Oishi at 7:34–42:<br><br>Accordingly, when the RF input is selected, the television receiver 11 reproduces the picture and sound of terrestrial television broadcasting in the VHF and UHF bands. When the external video/audio input Video(1) is selected, the television receiver 11 reproduces the picture and sound of BS broadcasting based on the output of the BS tuner 12. When the external video/audio input Video(2) is selected, the television receiver 11 reproduces the picture and sound of CS broadcasting based on the output of the CS tuner 13. |

| Asserted Claims | Oishi |
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| | Oishi at 9:34–42:<br><br>The setting for the CS tuner 13 is made via an operation unit 62, and the setting is displayed in a display unit 63. The control circuit 61 is provided with a frequency conversion table 64. The frequency conversion table 63 shows the correspondence between the frequency information of the satellite system shown in NIT (Network Information Table) and the frequency information of the transmission system of the signals transmitted via the cable 10. The frequency conversion table 64 is referenced when the receiving frequency is set in the tuner circuit 43.<br><br>To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Oishi discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Oishi at 3:22–30:<br><br>Accordingly, it is an object of the present invention to provide a television signal distribution apparatus, a receiver apparatus, and a television signal transmission system and method, which allows, without implementing large-scale works, terrestrial broadcasting signals in the VHF and UHF bands, the BS intermediate frequency signals, and CS intermediate frequency signals of a CS broadcasting service which employs two or more satellites to be multiplexed for transmission to each household via a single cable. |

| Asserted Claims | Oishi |
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| | Oishi at 3:31–53:<br><br>To this end, the present invention provides a television signal transmission system including a television signal distributor apparatus which delivers signals received via a master antenna to each household via a cable; and at least one receiver apparatus provided in each household. The television signal distributor apparatus includes a modulation format converting unit for converting the modulation format of received CS broadcast signals to thereby accommodate the signals in a narrower bandwidth, and for frequency-shifting the signals accommodated in the narrower bandwidth into a vacant frequency band; and a mixing unit for mixing for transmission via the cable the frequency-shifted signals accommodated in said narrower bandwidth with other type or types of received broadcast signals. The at least one receiver apparatus includes a receiving unit for receiving CS broadcast signals which have undergone conversion of modulation format so as to be accommodated in a narrower bandwidth and which have then been frequency-shifted into a vacant frequency band; a demodulating unit for demodulating the received signals in accordance with the modulation format after conversion; and a decoding unit for decoding the output from the demodulating unit to obtain video signals and audio signals.<br><br>Oishi at 3:54–4:3:<br><br>In accordance with the present invention, the modulation format of CS intermediate frequency signals is converted, for example, from QPSK to 64-QAM; thus, CS broadcasting signals from each transponder, having a bandwidth of, for example, 27 MHz, are accommodated in a bandwidth of, for example, 6 MHz, which is equivalent to a single channel for terrestrial broadcasting. The CS signals which have undergone conversion of the modulation format are frequency-shifted into a vacant channel in the VHF band or the UHF band. The frequency-shifted CS signals are multiplexed with BS intermediate frequency signals and terrestrial broadcasting signals for transmission to each household via a single cable. Accordingly, signals for a CS broadcasting service, even if provided via two or more satellites, can be transmitted to each household via a single cable together with signals for a BS broadcasting service and terrestrial broadcasting signals. |

| Asserted Claims | Oishi |
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| | Oishi at 4:45–56:<br><br>In accordance with the present invention, CS broadcasting signals from each transponder received via a master antenna undergo conversion of the modulation format so that the signals are accommodated in a narrower bandwidth. The signals accommodated in the narrower bandwidth are then frequency-shifted into a vacant channel in the VHF band or the UHF band. This eliminates the need to provide an additional band for the CS broadcasting signals; thus, the CS broadcasting signals, even if serviced by two or more satellites, can be delivered to each household via a single cable together with terrestrial television broadcasting signals and BS broadcasting signals.<br><br>Oishi at 4:57–5:9:<br><br>FIG. 3 shows the frequency allocation of signals transmitted via a cable. Referring to FIG. 3, A 1 (90 MHz to 108 MHz) is the VHF low band, A2 (108 MHz to 170 MHz) is the VHF mid band, A3 (170 MHz to 222 MHz) is the VHF high band, A4 (222 MHz to 470 MHz) is the VHF super high band, A5 (470 MHz to 770 MHz) is the UHF band, and A6 (1035 MHz to 1335 MHz) is a band for intermediate frequency signals of BS broadcasting signals. Currently, the VHF low band A1 and the VHF high band A3 are used for VHF terrestrial television broadcasting, and the UHF band A5 is used for UHF terrestrial television broadcasting. The VHF mid band A2 and the VHF super high band A4 are allocated for CATV (Cable Television); and therefore, the bands are vacant where CATV service is not used. The BS broadcasting signals are broadcast on electromagnetic waves in the 12-GHz band. When received via a parabola antenna, the BS broadcasting signals are converted into intermediate frequency signals in the 1-GHz band in an LNB (Low Noise Block Down Converter) provided in association with the parabola antenna.<br><br>Oishi at 6:17–27:<br><br>FIG. 4 illustrates the overall construction of a television signal transmission system, as connected to associated systems, according to the embodiment of present invention. Referring to FIG. 4, there are shown parabola antennas 1A and 1B for receiving CS |

| Asserted Claims | Oishi |
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| | broadcasting signals, a parabola antenna 2 for receiving BS broadcasting signals, and antennas 3A and 3B for receiving terrestrial broadcasting signals respectively in the VHF band and in the UHF band. The antennas 1A, 1B, 2, 3A, and 3B are master antennas, and are provided, for example, on the rooftop of an apartment building.<br><br>Oishi at 6:28–34:<br><br>The CS parabola antennas 1A and 1B receive signals transmitted from two communications satellites 8A and 8B. The parabola antennas 1A and 1B are provided with LNBs 9A and 9B, respectively. The LNBs 9A and 9B converts CS broadcasting signals in the 12-GHz band into intermediate frequency signals. The outputs of the LNBs 9A and 9B are fed to a modulation format conversion unit 4.<br><br>Oishi at 6:43–48:<br><br>The BS parabola antenna 2 receives signals from a broadcasting satellite 6. The parabola antenna 2 is provided with an LNB 7. The LNB 7 converts signals in the 12-GHz band received by the parabola antenna 2 into intermediate frequency signals in the 1-GHz band. The output of the LNB 7 is fed to the mixer 5.<br><br>Oishi at 6:49–51:<br><br>The antennas 3A and 3B receive terrestrial broadcasting signals in the VHF and UHF bands. The outputs of the antennas 3A and 3B are fed to the mixer 5.<br><br>Oishi at 6:52–54:<br><br>The mixer 5 mixes the output from the modulation format conversion unit 4, the output from the LNB 7, and the output from the antennas 3A and 3B.<br><br>Oishi at 7:1–9: |

| Asserted Claims | Oishi |
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| | The CS intermediate frequency signals which have undergone conversion of the modulation format and which have been frequency-shifted are fed from the terminal 14 via an RF through circuit and a distributor circuit of the BS tuner 12 to the CS tuner 13. The CS tuner 13 demodulates the CS intermediate frequency signals to obtain video signals and audio signals, for example, in the NTSC format. The output of the CS tuner 12 is fed to the other external video/audio input terminal Video(2) of the television receiver 11.<br><br>Oishi at 7:51–59:<br><br>The modulation format conversion unit 4 includes conversion circuits 4A, 4B, 4C, etc. The conversion circuits 4A, 4B, 4C, etc. receive CS intermediate frequency signals corresponding to the vertically polarized and horizontally polarized signals from each of the two satellites 8A and 8B, converts the modulation format of the signals, and frequency-shifts the signals into a vacant band for terrestrial television broadcasting. The conversion circuits 4A, 4B, 4C, etc. are configured identical to one another.<br><br>Oishi at 7:60–65:<br><br>Referring to FIG. 5, CS intermediate frequency signals output from the LNBs 9A and 9B of the parabola antennas 1A and 1B are fed to an input terminal 21. The signals input to the input terminal 21 are fed to each tuner circuit 22 of the modulation circuit 4A, 4B, 4C, etc. The tuner circuit 22 selects signals on a desired carrier wave.<br><br>Oishi at 7:66–8:4:<br><br>The output of the tuner circuit 22 is fed to a QPSK demodulation circuit 23. The QPSK demodulation circuit 23 demodulates the signals modulated by QPSK. The output of the QPSK circuit 23 is fed to an ECC (Error Correction Code) decoder 24. The output of the ECC decoder 24 is fed to an ECC encoder 25.<br><br>Oishi at 8:21–27: |

| Asserted Claims | Oishi |
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| | The tuner circuit 22, the QPSK demodulation circuit 23, the ECC decoder 24, the ECC encoder 25, the QAM modulation circuit 26, and the frequency conversion circuit 27 are controlled by a control circuit 30 via an interface 29. The control circuit is connected to an operation unit 31 which allows setting and to a display unit 32 for displaying the setting.<br><br>Oishi at 8:28–42:<br><br>As described above, in each of the conversion circuits 4A, 4B, 4C, etc. of the modulation format conversion unit 4, the QPSK demodulation circuit 23 and the QAM modulation circuit converts the modulation format of the signals corresponding to each of the carrier waves of the CS broadcasting signals from QPSK into 64-QAM, the ECC decoder 24 and the ECC encoder 25 reassigns error correction codes for the signals, and the frequency conversion circuit 27 frequency-shifts the signals into a vacant channel for terrestrial broadcasting. Thus, the CS signals from a single transponder having a bandwidth of, for example, 27 MHz, are accommodated in a narrower bandwidth, for example, 6 MHz, and the signals are then frequency-shifted into a vacant channel in the VHF band or the UHF band for terrestrial broadcasting.<br><br>Oishi at 8:56–64:<br><br>The tuner circuit 43 selects signals at a desired frequency from the CS signals shifted into a vacant channel in the VHF band or the UHF band. The output of the tuner circuit 43 is fed to a QAM demodulation circuit 44. The QAM demodulation circuit 44 demodulates the signals modulated by 64-QAM. The output of the QAM demodulation circuit 44 is fed to an ECC decoder 45. The ECC decoder 45 performs processing for error correction using Reed-Solomon codes.<br><br>Oishi at 9:57–65:<br><br>In accordance with the system, however, the CS intermediate frequency signals are frequency-shifted into a vacant channel in the VHF band or in the UHF band in the modulation format conversion unit 4 when the signals are transmitted to each household via the cable 10; thus, it is not feasible to set receive frequency directly from NIT |

| Asserted Claims | Oishi |
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| | information. It may be possible, but very complex, to rewrite NIT information when the signals are frequency-shifted in the modulation format conversion unit 4.<br><br>Oishi at [0093]:<br><br>In accordance with the above-described embodiment, the modulation format of CS intermediate frequency signals is converted from QPSK into 64-QAM so that the signals are accommodated in a narrower bandwidth, and the signals are then frequency-shifted into a vacant band in the VHF mid band, the VHF super high band, or the UHF band. Accordingly, the CS broadcasting signals, even if serviced by two satellites, are allowed to be transmitted in a single cable together with BS broadcasting signals and terrestrial broadcasting signals.<br><br>Oishi at [0094]:<br><br>It is to be appreciated that although the modulation format is converted from QPSK into 64-QAM in the above-described embodiment, the present invention is not limited thereto, and the conversion may be any type from a modulating format compatible with signals from satellites to a modulating format which accommodates the signals in a narrower bandwidth which allows transmission in a single channel for terrestrial broadcasting.<br><br>Oishi at [0095]:<br><br>Furthermore, although the modulation format conversion unit 4 in the above-described embodiment performs conversion of modulation format and reassignment of error correction codes, the reassignment of error correction codes may be omitted. However, the reassignment of error correction code should preferably be incorporated so that the modulation format and the error correction coding format of the CS broadcasting signals transmitted via the cable 10 will be the same as those of the modulation format and the error correction coding format of digital CATV. This allows a settop box for digital CATV and the CS tuner to share a common chip, serving to reduce relevant cost. |

| Asserted Claims | Oishi |
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| | To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Oishi discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Oishi at 3:22–30:<br><br>Accordingly, it is an object of the present invention to provide a television signal distribution apparatus, a receiver apparatus, and a television signal transmission system and method, which allows, without implementing large-scale works, terrestrial broadcasting signals in the VHF and UHF bands, the BS intermediate frequency signals, and CS intermediate frequency signals of a CS broadcasting service which employs two or more satellites to be multiplexed for transmission to each household via a single cable.<br><br>Oishi at 3:31–53:<br><br>To this end, the present invention provides a television signal transmission system including a television signal distributor apparatus which delivers signals received via a master antenna to each household via a cable; and at least one receiver apparatus provided in each household. The television signal distributor apparatus includes a modulation format converting unit for converting the modulation format of received CS broadcast signals to thereby accommodate the signals in a narrower bandwidth, and for frequency-shifting the signals accommodated in the narrower bandwidth into a vacant frequency band; and a mixing unit for mixing for transmission via the cable the frequency-shifted signals |

| Asserted Claims | Oishi |
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| | accommodated in said narrower bandwidth with other type or types of received broadcast signals. The at least one receiver apparatus includes a receiving unit for receiving CS broadcast signals which have undergone conversion of modulation format so as to be accommodated in a narrower bandwidth and which have then been frequency-shifted into a vacant frequency band; a demodulating unit for demodulating the received signals in accordance with the modulation format after conversion; and a decoding unit for decoding the output from the demodulating unit to obtain video signals and audio signals.<br><br>Oishi at 3:54–4:3:<br><br>In accordance with the present invention, the modulation format of CS intermediate frequency signals is converted, for example, from QPSK to 64-QAM; thus, CS broadcasting signals from each transponder, having a bandwidth of, for example, 27 MHz, are accommodated in a bandwidth of, for example, 6 MHz, which is equivalent to a single channel for terrestrial broadcasting. The CS signals which have undergone conversion of the modulation format are frequency-shifted into a vacant channel in the VHF band or the UHF band. The frequency-shifted CS signals are multiplexed with BS intermediate frequency signals and terrestrial broadcasting signals for transmission to each household via a single cable. Accordingly, signals for a CS broadcasting service, even if provided via two or more satellites, can be transmitted to each household via a single cable together with signals for a BS broadcasting service and terrestrial broadcasting signals.<br><br>Oishi at 6:35–42:<br><br>The modulation format conversion unit 4 converts the modulation format of the CS intermediate signals, for example, from QPSK to 64-QAM, to accommodate the signals in a narrower bandwidth. The modulation format conversion unit 4 then frequency-shifts the signals accommodated in the narrower bandwidth into a vacant channel in the VHF band or in the UHF band. The output of the modulation format conversion unit 4 is fed to a mixer 5.<br><br>Oishi at 6:43–48: |

| Asserted Claims | Oishi |
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| | The BS parabola antenna 2 receives signals from a broadcasting satellite 6. The parabola antenna 2 is provided with an LNB 7. The LNB 7 converts signals in the 12-GHz band received by the parabola antenna 2 into intermediate frequency signals in the 1-GHz band. The output of the LNB 7 is fed to the mixer 5.<br><br>Oishi at 6:49–51:<br><br>The antennas 3A and 3B receive terrestrial broadcasting signals in the VHF and UHF bands. The outputs of the antennas 3A and 3B are fed to the mixer 5.<br><br>Oishi at 6:52–54:<br><br>The mixer 5 mixes the output from the modulation format conversion unit 4, the output from the LNB 7, and the output from the antennas 3A and 3B.<br><br>Oishi at 6:55–56:<br><br>The output of the mixer 5 is fed through a cable 10 and via a distributor to a terminal 14 in each household.<br><br>Oishi at 7:13–23:<br><br>As described above, in the television signal transmission system shown in FIG. 4, the modulation format conversion unit 4 converts the modulation format of the CS intermediate frequency signals so as to accommodate the signals in a narrower bandwidth, and frequency-shifts the signals into a vacant band in the VHF band or in the UHF band. Then, the output of the modulation format conversion unit 4 is multiplexed in the mixer 5 with the BS intermediate frequency signals and terrestrial broadcasting signals in the VHF and UHF bands, so that the mixed signals are transmitted to each household via the cable 10.<br><br>Oishi at 8:43–45: |

| Asserted Claims | Oishi |
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| | The output of each of the conversion circuits 4A, 4B, 4C, etc. are fed to the mixer 33. The output of the mixer 33 is fed to an output terminal 34.<br><br>To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Oishi discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Oishi at 3:22–30:<br><br>Accordingly, it is an object of the present invention to provide a television signal distribution apparatus, a receiver apparatus, and a television signal transmission system and method, which allows, without implementing large-scale works, terrestrial broadcasting signals in the VHF and UHF bands, the BS intermediate frequency signals, and CS intermediate frequency signals of a CS broadcasting service which employs two or more satellites to be multiplexed for transmission to each household via a single cable.<br><br>Oishi at 3:31–53:<br><br>To this end, the present invention provides a television signal transmission system including a television signal distributor apparatus which delivers signals received via a master antenna to each household via a cable; and at least one receiver apparatus provided in each household. The television signal distributor apparatus includes a modulation format |

| Asserted Claims | Oishi |
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| | converting unit for converting the modulation format of received CS broadcast signals to thereby accommodate the signals in a narrower bandwidth, and for frequency-shifting the signals accommodated in the narrower bandwidth into a vacant frequency band; and a mixing unit for mixing for transmission via the cable the frequency-shifted signals accommodated in said narrower bandwidth with other type or types of received broadcast signals. The at least one receiver apparatus includes a receiving unit for receiving CS broadcast signals which have undergone conversion of modulation format so as to be accommodated in a narrower bandwidth and which have then been frequency-shifted into a vacant frequency band; a demodulating unit for demodulating the received signals in accordance with the modulation format after conversion; and a decoding unit for decoding the output from the demodulating unit to obtain video signals and audio signals.<br><br>Oishi at 7:10–12:<br><br>The terrestrial broadcasting signals are fed from the terminal 14, through the BS tuner 12 and the CS tuner 13, to an RF input terminal of the television receiver 11.<br><br>To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Oishi discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>*See, e.g.*:<br><br>Oishi at 2:12–32: |

| Asserted Claims | Oishi |
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| | More specifically, when BS intermediate frequency signals and the VHF-band and UHF-band terrestrial broadcasting signals are mixed for transmission via the same cable in the conventional television signal transmission systems, the frequency allocation of the mixed signals is as shown in FIG. 2. Referring to FIG. 2, the frequency allocation includes the VHF low band A 11, the VHF mid band A12, the VHF high band A13, the VHF super high band A14, the UHF band A15, and the frequency band A16 for BS intermediate frequency signals. When CS intermediate frequency signals are also mixed with the BS intermediate frequency signals and the VHF-band and UHF-band terrestrial broadcasting signals for transmission via the same cable, frequency bands A17 and A18 above the frequency band A16 for BS intermediate frequency signals are allocated respectively for vertically polarized signals and horizontally polarized signals of the CS intermediate frequency signals. The vertically polarized signals and the horizontally polarized signals of the CS intermediate frequency signals in the 1-GHz band B11 and B12 are frequency-shifted into the frequency bands A17 and A18.<br><br>Oishi at 2:33–43:<br><br>As described above, by frequency-shifting CS intermediate frequency signals so that the CS intermediate frequency signals are allocated in the frequency bands A 17 and A18 above the frequency band A16 for BS intermediate frequency signals, the frequency band A16 for BS intermediate frequency signals and the frequency bands A17 and A18 for CS intermediate frequency signals do not overlap, allowing the VHF-band and UHF-band terrestrial broadcasting signals, the BS intermediate frequency signals, and the CS intermediate frequency signals to be transmitted via a single cable.<br><br>Oishi at 4:57–5:9:<br><br>FIG. 3 shows the frequency allocation of signals transmitted via a cable. Referring to FIG. 3, A 1 (90 MHz to 108 MHz) is the VHF low band, A2 (108 MHz to 170 MHz) is the VHF mid band, A3 (170 MHz to 222 MHz) is the VHF high band, A4 (222 MHz to 470 MHz) is the VHF super high band, A5 (470 MHz to 770 MHz) is the UHF band, and A6 (1035 |

| Asserted Claims | Oishi |
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| | MHz to 1335 MHz) is a band for intermediate frequency signals of BS broadcasting signals. Currently, the VHF low band A1 and the VHF high band A3 are used for VHF terrestrial television broadcasting, and the UHF band A5 is used for UHF terrestrial television broadcasting. The VHF mid band A2 and the VHF super high band A4 are allocated for CATV (Cable Television), and therefore, the bands are vacant where CATV service is not used. The BS broadcasting signals are broadcast on electromagnetic waves in the 12-GHz band. When received via a parabola antenna, the BS broadcasting signals are converted into intermediate frequency signals in the 1-GHz band in an LNB (Low Noise Block Down Converter) provided in association with the parabola antenna.<br>Oishi at 9:34–42:<br><br>The setting for the CS tuner 13 is made via an operation unit 62, and the setting is displayed in a display unit 63. The control circuit 61 is provided with a frequency conversion table 64. The frequency conversion table 63 shows the correspondence between the frequency information of the satellite system shown in NIT (Network Information Table) and the frequency information of the transmission system of the signals transmitted via the cable 10. The frequency conversion table 64 is referenced when the receiving frequency is set in the tuner circuit 43.<br><br>Oishi at 9:48–56:<br><br>An ordinary CS broadcast receiver obtains NIT including information regarding carrier frequency characteristics, and based thereon, set the receive frequency to a desired channel. Then, reference is made to PAT (Program Association Table) packet. PAT includes information regarding channels on the carrier waves, and PID for PMT (Program Map Table) representing the contents for each of the channels. Based on the PAT information, video packets and audio packets for a desired channel on the carrier waves are separated, so that a desired program is received.<br><br>Oishi at 9:57–65: |

| Asserted Claims | Oishi |
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| | In accordance with the system, however, the CS intermediate frequency signals are frequency-shifted into a vacant channel in the VHF band or in the UHF band in the modulation format conversion unit 4 when the signals are transmitted to each household via the cable 10; thus, it is not feasible to set receive frequency directly from NIT information. It may be possible, but very complex, to rewrite NIT information when the signals are frequency-shifted in the modulation format conversion unit 4.<br><br>Oishi at 9:66–10:3:<br><br>Accordingly, in this embodiment, a frequency conversion table 54 is provided. The frequency conversion table stores the correspondence between frequency information for the satellite system obtained from the NIT and frequency information for the signal transmitted via the cable 10.<br><br>Oishi at 10:4–10:<br><br>In order to receive a desired program, NIT information must be obtained. NIT information is not frequently updated, and is provided once a day and stored in a storage medium within the receiver apparatus. FIG. 7 shows the data structure of NIT. NIT includes satellite delivery descriptor which describes frequency information and transmission parameters required to receive the signals.<br><br>Oishi at 10:11–15:<br><br>FIG. 8 shows the data structure of the satellite delivery descriptor. Information regarding programs for each channel is described in service list descriptor included in NIT. The data structure of the service list descriptor is shown in FIG. 9.<br><br>Oishi at 10:16–23:<br><br>In receive operation, first, information regarding the channel, i.e., frequency band, including a desired program is obtained from the service list descriptor and the satellite delivery descriptor included in NIT. Then, a frequency of the cable transmission system |

| Asserted Claims | Oishi |
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| | corresponding to the obtained frequency is read from the frequency conversion table 64. The receive frequency of the tuner circuit 43 is set in accordance with the frequency read from the frequency conversion table 64.<br><br>Oishi at 10:24–27:<br><br>Then, reference is made to PAT packets, and based on PAT information, video packets and audio packets with PID corresponding to a desired channel are separated, so that a desired program is received.<br><br>Oishi at 10:28–34:<br><br>The frequency conversion table 64, which shows the correspondence between the frequency information of the satellite system described in NIT included in data transmitted from a satellite, and actual frequency information of the signals transmitted via the cable 10, is created when the system is initially powered on after the system is configured, in a processing as shown in FIG. 10.<br><br>Oishi at 10:34–42:<br><br>FIG. 10 is a flowchart showing an example of processing for creating the frequency conversion table 64 which shows the correspondence between the frequency information described in NIT of the satellite system and the frequency information of the cable transmission system. Referring to FIG. 10, in step S1, a desired channel is specified, for example, via a menu displayed on the screen, so that corresponding QAM signals are received and NIT information is obtained.<br><br>Oishi at 10:43–58:<br><br>In a television signal transmission system, once the frequency information of the cable transmission system is set, the information need not be frequently updated. In addition, channel information in the initial setting can be notified to the viewers by, for example, those in charge of management of the relevant facility. Thus, in step S 2, the frequency |

| Asserted Claims | Oishi |
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| | information of the cable transmission system is input via, for example, initial setting menu displayed on the screen. Accordingly, the frequency conversion table 64, which shows the correspondence between the frequency information of the satellite system and the frequency information of the cable transmission system, is created and stored in memory in step S3. Because the channels for retransmission of the CS signals are fixed, i.e., the bands A2 and A4 in FIG. 3, the setting of frequency information can be made in accordance with the setting of the modulation format conversion unit 4 prior to shipping of receiver apparatuses.<br><br>Oishi at 10:61–65:<br><br>Referring to FIG. 11, first, reference is made to the frequency conversion table 64 in step S11. In step S12, it is determined whether the channel exists. If the "M" channel is not found, a "channel unavailable" message is displayed in step S13 to exit processing.<br><br>Oishi at 10:66–11:3:<br><br>If the channel "M" is found in step S 12, the frequency of the cable transmission system corresponding to the channel "M" is obtained from the frequency conversion table 64, and the receive frequency of the tuner circuit 43 is set thereto in step S14.<br><br>Oishi at Fig. 10: |

| Asserted Claims | Oishi |
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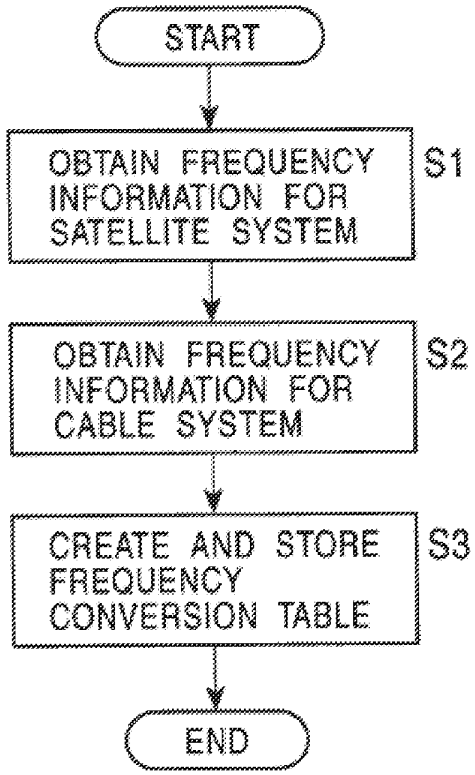
| | FIG. 10<br>  <br><br>Oishi at Fig. 11: |

| Asserted Claims | Oishi |
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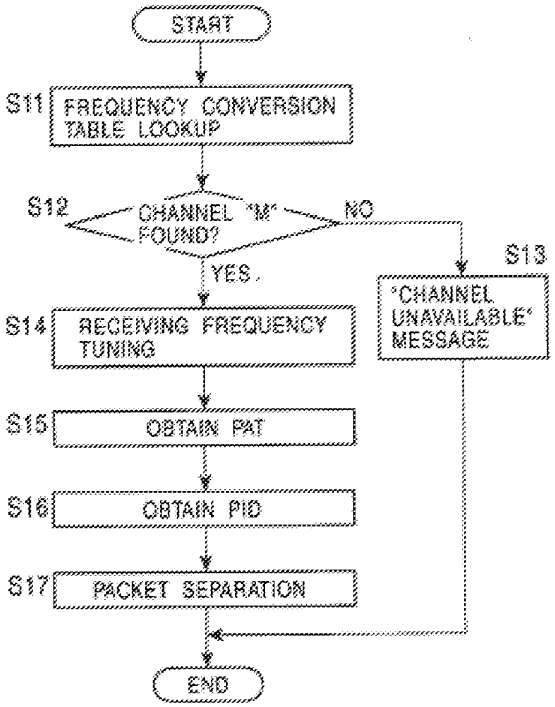
| | FIG. 11<br>  <br><br>To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Oishi |
|---|---|
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Oishi discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Oishi at 2:12–32:<br><br>More specifically, when BS intermediate frequency signals and the VHF-band and UHF-band terrestrial broadcasting signals are mixed for transmission via the same cable in the conventional television signal transmission systems, the frequency allocation of the mixed signals is as shown in FIG. 2. Referring to FIG. 2, the frequency allocation includes the VHF low band A 11, the VHF mid band A12, the VHF high band A13, the VHF super high band A14, the UHF band A15, and the frequency band A16 for BS intermediate frequency signals. When CS intermediate frequency signals are also mixed with the BS intermediate frequency signals and the VHF-band and UHF-band terrestrial broadcasting signals for transmission via the same cable, frequency bands A17 and A18 above the frequency band A16 for BS intermediate frequency signals are allocated respectively for vertically polarized signals and horizontally polarized signals of the CS intermediate frequency signals. The vertically polarized signals and the horizontally polarized signals of the CS intermediate frequency signals in the 1-GHz band B11 and B12 are frequency-shifted into the frequency bands A17 and A18.<br><br>Oishi at 2:33–43:<br><br>As described above, by frequency-shifting CS intermediate frequency signals so that the CS intermediate frequency signals are allocated in the frequency bands A 17 and A18 |

| Asserted Claims | Oishi |
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| | above the frequency band A16 for BS intermediate frequency signals, the frequency band A16 for BS intermediate frequency signals and the frequency bands A17 and A18 for CS intermediate frequency signals do not overlap, allowing the VHF-band and UHF-band terrestrial broadcasting signals, the BS intermediate frequency signals, and the CS intermediate frequency signals to be transmitted via a single cable.<br><br>Oishi at 4:57–5:9:<br><br>FIG. 3 shows the frequency allocation of signals transmitted via a cable. Referring to FIG. 3, A 1 (90 MHz to 108 MHz) is the VHF low band, A2 (108 MHz to 170 MHz) is the VHF mid band, A3 (170 MHz to 222 MHz) is the VHF high band, A4 (222 MHz to 470 MHz) is the VHF super high band, A5 (470 MHz to 770 MHz) is the UHF band, and A6 (1035 MHz to 1335 MHz) is a band for intermediate frequency signals of BS broadcasting signals. Currently, the VHF low band A1 and the VHF high band A3 are used for VHF terrestrial television broadcasting, and the UHF band A5 is used for UHF terrestrial television broadcasting. The VHF mid band A2 and the VHF super high band A4 are allocated for CATV (Cable Television); and therefore, the bands are vacant where CATV service is not used. The BS broadcasting signals are broadcast on electromagnetic waves in the 12-GHz band. When received via a parabola antenna, the BS broadcasting signals are converted into intermediate frequency signals in the 1-GHz band in an LNB (Low Noise Block Down Converter) provided in association with the parabola antenna.<br><br>Oishi at 9:34–42:<br><br>The setting for the CS tuner 13 is made via an operation unit 62, and the setting is displayed in a display unit 63. The control circuit 61 is provided with a frequency conversion table 64. The frequency conversion table 63 shows the correspondence between the frequency information of the satellite system shown in NIT (Network Information Table) and the frequency information of the transmission system of the signals transmitted via the cable 10. The frequency conversion table 64 is referenced when the receiving frequency is set in the tuner circuit 43. |

| Asserted Claims | Oishi |
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| | Oishi at 9:48–56:<br><br>An ordinary CS broadcast receiver obtains NIT including information regarding carrier frequency characteristics, and based thereon, set the receive frequency to a desired channel. Then, reference is made to PAT (Program Association Table) packet. PAT includes information regarding channels on the carrier waves, and PID for PMT (Program Map Table) representing the contents for each of the channels. Based on the PAT information, video packets and audio packets for a desired channel on the carrier waves are separated, so that a desired program is received.<br><br>Oishi at 9:57–65:<br><br>In accordance with the system, however, the CS intermediate frequency signals are frequency-shifted into a vacant channel in the VHF band or in the UHF band in the modulation format conversion unit 4 when the signals are transmitted to each household via the cable 10; thus, it is not feasible to set receive frequency directly from NIT information. It may be possible, but very complex, to rewrite NIT information when the signals are frequency-shifted in the modulation format conversion unit 4.<br><br>Oishi at 9:66–10:3:<br><br>Accordingly, in this embodiment, a frequency conversion table 54 is provided. The frequency conversion table stores the correspondence between frequency information for the satellite system obtained from the NIT and frequency information for the signal transmitted via the cable 10.<br><br>Oishi at 10:4–10:<br><br>In order to receive a desired program, NIT information must be obtained. NIT information is not frequently updated, and is provided once a day and stored in a storage medium within the receiver apparatus. FIG. 7 shows the data structure of NIT. NIT includes |

| Asserted Claims | Oishi |
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| | satellite delivery descriptor which describes frequency information and transmission parameters required to receive the signals.<br><br>Oishi at 10:11–15:<br><br>FIG. 8 shows the data structure of the satellite delivery descriptor. Information regarding programs for each channel is described in service list descriptor included in NIT. The data structure of the service list descriptor is shown in FIG. 9.<br><br>Oishi at 10:16–23:<br><br>In receive operation, first, information regarding the channel, i.e., frequency band, including a desired program is obtained from the service list descriptor and the satellite delivery descriptor included in NIT. Then, a frequency of the cable transmission system corresponding to the obtained frequency is read from the frequency conversion table 64. The receive frequency of the tuner circuit 43 is set in accordance with the frequency read from the frequency conversion table 64.<br><br>Oishi at 10:24–27:<br><br>Then, reference is made to PAT packets, and based on PAT information, video packets and audio packets with PID corresponding to a desired channel are separated, so that a desired program is received.<br><br>Oishi at 10:28–34:<br><br>The frequency conversion table 64, which shows the correspondence between the frequency information of the satellite system described in NIT included in data transmitted from a satellite, and actual frequency information of the signals transmitted via the cable 10, is created when the system is initially powered on after the system is configured, in a processing as shown in FIG. 10. |

| Asserted Claims | Oishi |
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| | Oishi at 10:34–42:<br><br>FIG. 10 is a flowchart showing an example of processing for creating the frequency conversion table 64 which shows the correspondence between the frequency information described in NIT of the satellite system and the frequency information of the cable transmission system. Referring to FIG. 10, in step S1, a desired channel is specified, for example, via a menu displayed on the screen, so that corresponding QAM signals are received and NIT information is obtained.<br><br>Oishi at 10:43–58:<br><br>In a television signal transmission system, once the frequency information of the cable transmission system is set, the information need not be frequently updated. In addition, channel information in the initial setting can be notified to the viewers by, for example, those in charge of management of the relevant facility. Thus, in step S 2, the frequency information of the cable transmission system is input via, for example, initial setting menu displayed on the screen. Accordingly, the frequency conversion table 64, which shows the correspondence between the frequency information of the satellite system and the frequency information of the cable transmission system, is created and stored in memory in step S3. Because the channels for retransmission of the CS signals are fixed, i.e., the bands A2 and A4 in FIG. 3, the setting of frequency information can be made in accordance with the setting of the modulation format conversion unit 4 prior to shipping of receiver apparatuses.<br><br>Oishi at 10:61–65:<br><br>Referring to FIG. 11, first, reference is made to the frequency conversion table 64 in step S11. In step S12, it is determined whether the channel exists. If the "M" channel is not found, a "channel unavailable" message is displayed in step S13 to exit processing.<br><br>Oishi at 10:66–11:3: |

| Asserted Claims | Oishi |
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| | If the channel "M" is found in step S 12, the frequency of the cable transmission system corresponding to the channel "M" is obtained from the frequency conversion table 64, and the receive frequency of the tuner circuit 43 is set thereto in step S14.<br><br>Oishi at Fig. 10: |

| Asserted Claims | Oishi |
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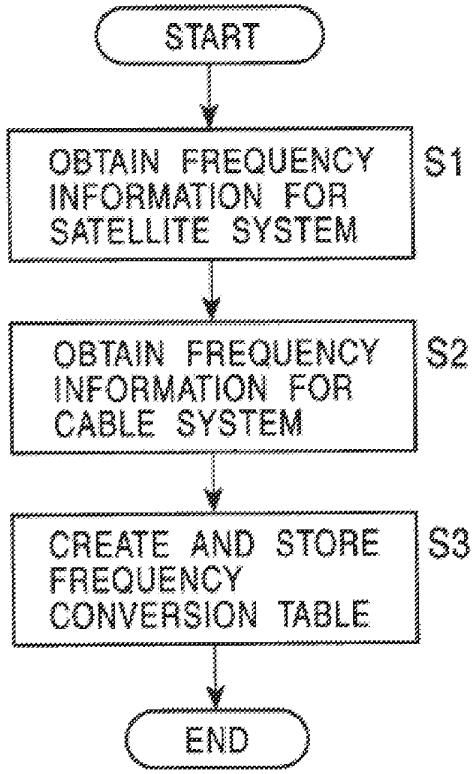
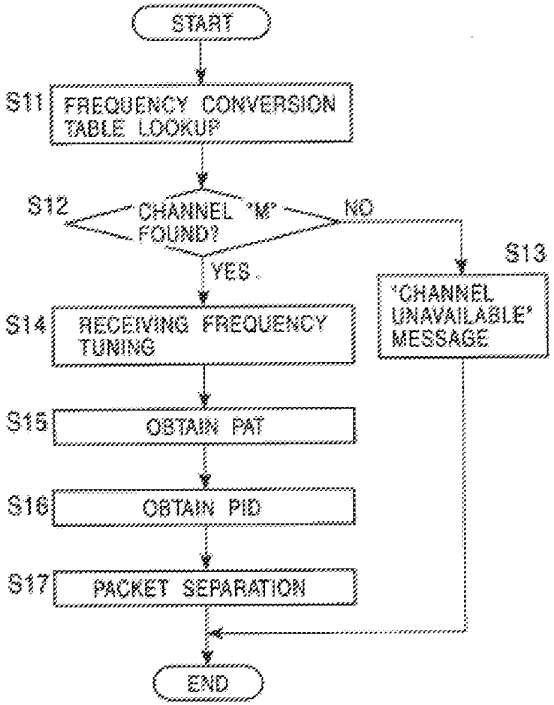
| | FIG. 10<br>  <br><br>Oishi at Fig. 11: |

| Asserted Claims | Oishi |
|---|---|
| | FIG. 11<br>  <br><br>To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Oishi |
|---|---|
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Oishi discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Oishi at 2:12–32:<br><br>More specifically, when BS intermediate frequency signals and the VHF-band and UHF-band terrestrial broadcasting signals are mixed for transmission via the same cable in the conventional television signal transmission systems, the frequency allocation of the mixed signals is as shown in FIG. 2. Referring to FIG. 2, the frequency allocation includes the VHF low band A 11, the VHF mid band A12, the VHF high band A13, the VHF super high band A14, the UHF band A15, and the frequency band A16 for BS intermediate frequency signals. When CS intermediate frequency signals are also mixed with the BS intermediate frequency signals and the VHF-band and UHF-band terrestrial broadcasting signals for transmission via the same cable, frequency bands A17 and A18 above the frequency band A16 for BS intermediate frequency signals are allocated respectively for vertically polarized signals and horizontally polarized signals of the CS intermediate frequency signals. The vertically polarized signals and the horizontally polarized signals of the CS intermediate frequency signals in the 1-GHz band B11 and B12 are frequency-shifted into the frequency bands A17 and A18.<br><br>Oishi at 2:33–43:<br><br>As described above, by frequency-shifting CS intermediate frequency signals so that the CS intermediate frequency signals are allocated in the frequency bands A 17 and A18 above the frequency band A16 for BS intermediate frequency signals, the frequency band |

| Asserted Claims | Oishi |
|---|---|
| | A16 for BS intermediate frequency signals and the frequency bands A17 and A18 for CS intermediate frequency signals do not overlap, allowing the VHF-band and UHF-band terrestrial broadcasting signals, the BS intermediate frequency signals, and the CS intermediate frequency signals to be transmitted via a single cable.<br><br>Oishi at 4:57–5:9:<br><br>FIG. 3 shows the frequency allocation of signals transmitted via a cable. Referring to FIG. 3, A 1 (90 MHz to 108 MHz) is the VHF low band, A2 (108 MHz to 170 MHz) is the VHF mid band, A3 (170 MHz to 222 MHz) is the VHF high band, A4 (222 MHz to 470 MHz) is the VHF super high band, A5 (470 MHz to 770 MHz) is the UHF band, and A6 (1035 MHz to 1335 MHz) is a band for intermediate frequency signals of BS broadcasting signals. Currently, the VHF low band A1 and the VHF high band A3 are used for VHF terrestrial television broadcasting, and the UHF band A5 is used for UHF terrestrial television broadcasting. The VHF mid band A2 and the VHF super high band A4 are allocated for CATV (Cable Television); and therefore, the bands are vacant where CATV service is not used. The BS broadcasting signals are broadcast on electromagnetic waves in the 12-GHz band. When received via a parabola antenna, the BS broadcasting signals are converted into intermediate frequency signals in the 1-GHz band in an LNB (Low Noise Block Down Converter) provided in association with the parabola antenna.<br><br>Oishi at 9:34–42:<br><br>The setting for the CS tuner 13 is made via an operation unit 62, and the setting is displayed in a display unit 63. The control circuit 61 is provided with a frequency conversion table 64. The frequency conversion table 63 shows the correspondence between the frequency information of the satellite system shown in NIT (Network Information Table) and the frequency information of the transmission system of the signals transmitted via the cable 10. The frequency conversion table 64 is referenced when the receiving frequency is set in the tuner circuit 43. |

| Asserted Claims | Oishi |
|---|---|
| | Oishi at 9:48–56:<br><br>An ordinary CS broadcast receiver obtains NIT including information regarding carrier frequency characteristics, and based thereon, set the receive frequency to a desired channel. Then, reference is made to PAT (Program Association Table) packet. PAT includes information regarding channels on the carrier waves, and PID for PMT (Program Map Table) representing the contents for each of the channels. Based on the PAT information, video packets and audio packets for a desired channel on the carrier waves are separated, so that a desired program is received.<br><br>Oishi at 9:57–65:<br><br>In accordance with the system, however, the CS intermediate frequency signals are frequency-shifted into a vacant channel in the VHF band or in the UHF band in the modulation format conversion unit 4 when the signals are transmitted to each household via the cable 10; thus, it is not feasible to set receive frequency directly from NIT information. It may be possible, but very complex, to rewrite NIT information when the signals are frequency-shifted in the modulation format conversion unit 4.<br><br>Oishi at 9:66–10:3:<br><br>Accordingly, in this embodiment, a frequency conversion table 54 is provided. The frequency conversion table stores the correspondence between frequency information for the satellite system obtained from the NIT and frequency information for the signal transmitted via the cable 10.<br><br>Oishi at 10:4–10:<br><br>In order to receive a desired program, NIT information must be obtained. NIT information is not frequently updated, and is provided once a day and stored in a storage medium within the receiver apparatus. FIG. 7 shows the data structure of NIT. NIT includes |

| Asserted Claims | Oishi |
|---|---|
| | satellite delivery descriptor which describes frequency information and transmission parameters required to receive the signals.<br><br>Oishi at 10:11–15:<br><br>FIG. 8 shows the data structure of the satellite delivery descriptor. Information regarding programs for each channel is described in service list descriptor included in NIT. The data structure of the service list descriptor is shown in FIG. 9.<br><br>Oishi at 10:16–23:<br><br>In receive operation, first, information regarding the channel, i.e., frequency band, including a desired program is obtained from the service list descriptor and the satellite delivery descriptor included in NIT. Then, a frequency of the cable transmission system corresponding to the obtained frequency is read from the frequency conversion table 64. The receive frequency of the tuner circuit 43 is set in accordance with the frequency read from the frequency conversion table 64.<br><br>Oishi at 10:24–27:<br><br>Then, reference is made to PAT packets, and based on PAT information, video packets and audio packets with PID corresponding to a desired channel are separated, so that a desired program is received.<br><br>Oishi at 10:28–34:<br><br>The frequency conversion table 64, which shows the correspondence between the frequency information of the satellite system described in NIT included in data transmitted from a satellite, and actual frequency information of the signals transmitted via the cable 10, is created when the system is initially powered on after the system is configured, in a processing as shown in FIG. 10. |

| Asserted Claims | Oishi |
|---|---|
| | Oishi at 10:34–42:<br><br>FIG. 10 is a flowchart showing an example of processing for creating the frequency conversion table 64 which shows the correspondence between the frequency information described in NIT of the satellite system and the frequency information of the cable transmission system. Referring to FIG. 10, in step S1, a desired channel is specified, for example, via a menu displayed on the screen, so that corresponding QAM signals are received and NIT information is obtained.<br><br>Oishi at 10:43–58:<br><br>In a television signal transmission system, once the frequency information of the cable transmission system is set, the information need not be frequently updated. In addition, channel information in the initial setting can be notified to the viewers by, for example, those in charge of management of the relevant facility. Thus, in step S 2, the frequency information of the cable transmission system is input via, for example, initial setting menu displayed on the screen. Accordingly, the frequency conversion table 64, which shows the correspondence between the frequency information of the satellite system and the frequency information of the cable transmission system, is created and stored in memory in step S3. Because the channels for retransmission of the CS signals are fixed, i.e., the bands A2 and A4 in FIG. 3, the setting of frequency information can be made in accordance with the setting of the modulation format conversion unit 4 prior to shipping of receiver apparatuses.<br><br>Oishi at 10:61–65:<br><br>Referring to FIG. 11, first, reference is made to the frequency conversion table 64 in step S11. In step S12, it is determined whether the channel exists. If the "M" channel is not found, a "channel unavailable" message is displayed in step S13 to exit processing.<br><br>Oishi at 10:66–11:3: |

| Asserted Claims | Oishi |
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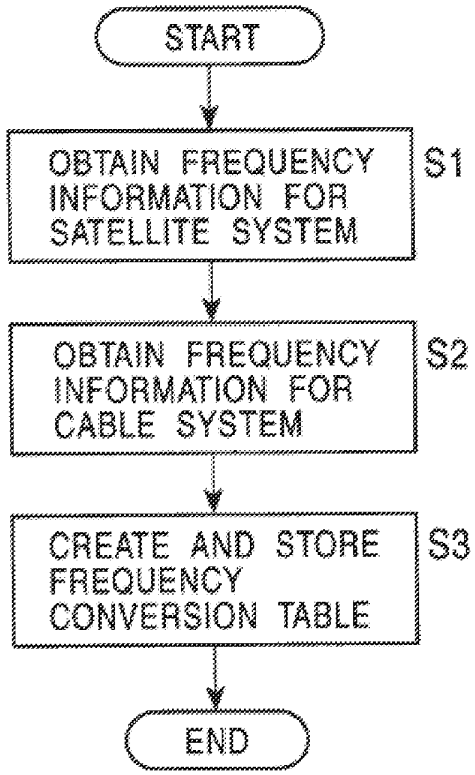
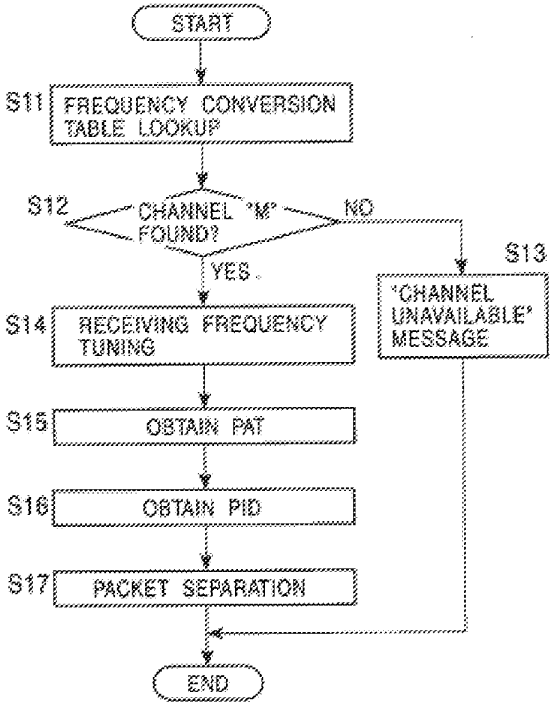
| | If the channel "M" is found in step S 12, the frequency of the cable transmission system corresponding to the channel "M" is obtained from the frequency conversion table 64, and the receive frequency of the tuner circuit 43 is set thereto in step S14.<br><br>Oishi at Fig. 10: |

| Asserted Claims | Oishi |
|---|---|
| | FIG. 10<br>  <br><br>Oishi at Fig. 11: |

| Asserted Claims | Oishi |
|---|---|
| | FIG. 11<br>  <br><br>To the extent Oishi does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Oishi alone or it would have been obvious to combine Oishi with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

# INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Petruzzelli

U.S. Patent No. 5,959,592 ("Petruzzelli")[2] was filed on March 14, 1997 and issued on September 29, 1999. Petruzzelli therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a), (b), and/or (e). For the reasons listed below, Petruzzelli invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Petruzzelli |
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| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Petruzzelli discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

[2] Petruzzelli was incorporated by reference in the '715 patent. *See* '715 patent at 2:32–45.



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| Asserted Claims | Petruzzelli |
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| | Petruzzelli at Abstract:<br><br>An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement.<br><br>Petruzzelli at 1:1–17:<br><br>This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver.<br><br>Petruzzelli at 1:21–37:<br><br>In the past, it has been common practice to provide a low noise amplifier as well as a block down converter within the antenna feed housing for a parabolic or concave microwave antenna. As is well known, radio frequency microwave energy strikes the surface of the parabolic antenna and is reflected to a focal point or locus where a feedhorn or feed is strategically positioned. The RF energy received is coupled to a wave guide which directs the radio frequency energy to the antenna probes. The received energy, whether in the "C-band" or "Ku-band" is amplified in a low noise amplifier to boost the strength of the signal and the signal is then converted usually by a factor of ten (10) through an oscillator and |

| Asserted Claims | Petruzzelli |
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| | mixer stage comprising a down block converter to a considerably lower intermediate frequency. This frequency is more conducive to transmission to the receiver by means of a less expensive transmission wire or conduit, such as a simple coaxial cable.<br><br>Petruzzelli at 1:38–62:<br><br>When working with the satellite transmission of television and audio signals and because of government regulations, the satellite system microwave signals cannot include local broadcast television channels and FM and AM broadcasted audio channels because of the political requirements for protection of these local broadcast facilities. Thus, the satellite user also requires the addition of local broadcast signals to the antenna system in order to acquire a complete spectrum of video and audio programming. This is usually accomplished by the provision of a separate VHF/UHF radio frequency antenna or cable TV input for the reception of the local programing frequencies. Thus, the present systems require the inclusion of a number of separate lead-in conduits from various signal sources, such as a terrestrial TV or microwave antenna, a satellite broadcast antenna, a cable TV transmission input as well as other types of video and audio programing input signals. All of these require individual and separate lead-ins, such as parallel open wire, coaxial cables or twin lead cables which feed from the outside of a home or structure along with separate satellite cabling to a suitable receiver. The signals are then combined within the receiver and/or converter before they are fed into a television set or monitor. In this way, a multitude of cumbersome lead-in cables are required to provide all of the programming sources which are desired.<br><br>Petruzzelli at 2:53–3:27:<br><br>Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13 Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two |

| Asserted Claims | Petruzzelli |
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| | polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure.<br><br>Petruzzelli at 4:24–46:<br><br>The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial received signals and the combined signal is then transmitted through a single cable to a |

| Asserted Claims | Petruzzelli |
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| | converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite signals for producing a stacked band of frequencies for transmission through the single lead-in cable.<br><br>Petruzzelli at 4:47–58:<br><br>The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system.<br><br>Petruzzelli at 4:59–68:<br><br>The Oleson patent (U.S. Pat. No. 4,675,732) discloses the processing of an incoming satellite antenna signal in a low noise block down converter mounted at the antenna. The output of the LNB is delivered to a splitter where it is divided into various individual signals. The satellite incoming signals can be combined with local UHF/VHF TV signals in a matrix and selectively distributed to attached TV sets. There is no teaching in this patent of any combining of the satellite signals and the terrestrial antenna signals at the antenna receiving head.<br><br>Petruzzelli at 5:1–15: |

| Asserted Claims | Petruzzelli |
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| | The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing.<br><br>Petruzzelli at 5:25–34:<br><br>The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna.<br><br>Petruzzelli at 5:38–45:<br><br>The present invention is directed primarily to a satellite parabolic antenna which has an LNB mounted within a housing and located at the focal point of the antenna. A wave guide collects the incoming RF radio frequency energy and directs the signal to a plurality of individual antenna probes. For the sake of illustration, the probes as disclosed and discussed herein are arranged for reception of right and left hand polarized incoming RF signals.<br><br>Petruzzelli at 5:62–6:21: |

| Asserted Claims | Petruzzelli |
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| | In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver.<br><br>Petruzzelli at 6:22–36:<br><br>This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. |

| Asserted Claims | Petruzzelli |
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| | Petruzzelli 7:12–7:24:<br><br>Turning now more specifically to the drawings, FIG. 2 shows a satellite type parabolic antenna 12 mounted on a support structure 14 and having an upwardly extending arm 16 mounted to bracket 18 and supporting an LNBF feed housing 20. A single output coaxial cable 22 is connected through the support arm 16 and LNBF feed housing for passage to the interior of the home or structure upon which the antenna is mounted. The cable 22 carries the output signals from the LNB housing and contains the satellite signals as well as any additionally attached auxiliary input signals. In this way, a single coaxial cable 22 carries all of the applicable RF signals for connection and operation to the satellite receiver and television set or monitor (not shown).<br><br>Petruzzelli at 7:49–56:<br><br>FIG. 4 is a block diagram showing the internal components mounted on the printed circuit board 32 and arranged to process the incoming signals received by the antenna 12 and guided through the wave guide 28 to the antenna probes 36. The satellite parabolic antenna 12 includes the feedhorn 20 precisely positioned at the focus of the antenna. The block diagrams which are shown in FIG. 4 are elements which are contained within the LNB feed housing 20.<br><br>Petruzzelli at 9:65–10:10:<br><br>It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system. |

| Asserted Claims | Petruzzelli |
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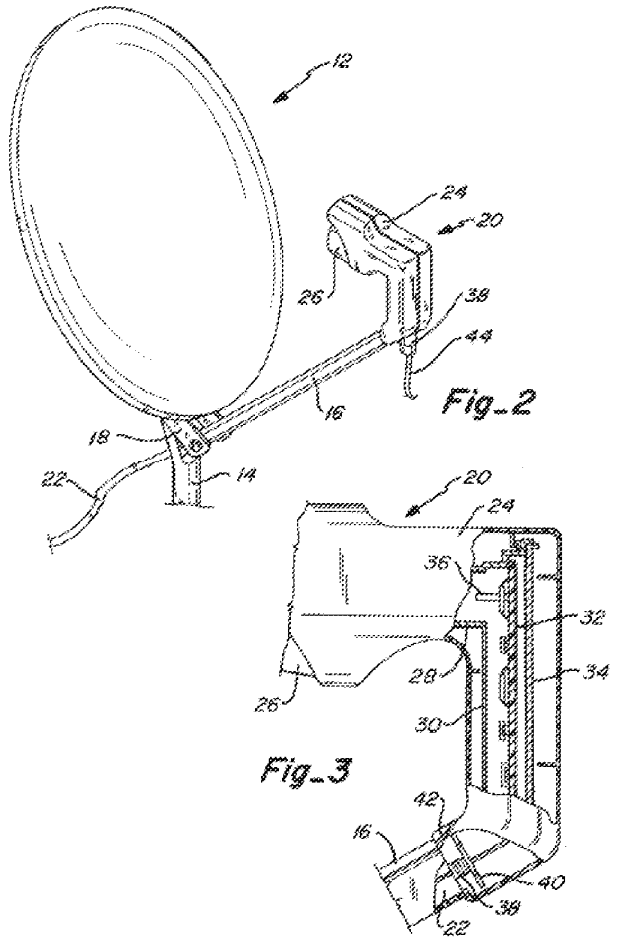
| | Petruzzelli at Fig. 2–3:<br>  <br> |

| Asserted Claims | Petruzzelli |
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| | '715 patent at 2:32–45:<br><br>U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable.<br><br>To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one | Petruzzelli discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*: |

| Asserted Claims | Petruzzelli |
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| broadband LNB signal based on the transponder select information; | Petruzzelli at 2:40–49:<br><br>In many direct broadcast satellite systems the transmission from the satellite is usually both right and left hand circular polarized. In this way, the actual bandwidth of the data being transmitted can be doubled to increase the capacity of the satellite. Thus, two separate bandwidth signals are transmitted simultaneously and received by the receiving antenna. In this way, two separate data streams are received by the common satellite parabolic antenna and these two signals each have a specific bandwidth and can be handled and processed separately.<br><br>Petruzzelli at 2:53–3:27:<br><br>Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13 Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. |

| Asserted Claims | Petruzzelli |
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| | In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure.<br><br>Petruzzelli at 4:24–46:<br><br>The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial received signals and the combined signal is then transmitted through a single cable to a converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite signals for producing a stacked band of frequencies for transmission through the single lead-in cable.<br><br>Petruzzelli at 4:59–68:<br><br>The Oleson patent (U.S. Pat. No. 4,675,732) discloses the processing of an incoming satellite antenna signal in a low noise block down converter mounted at the antenna. The |

| Asserted Claims | Petruzzelli |
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| | output of the LNB is delivered to a splitter where it is divided into various individual signals. The satellite incoming signals can be combined with local UHF/VHF TV signals in a matrix and selectively distributed to attached TV sets. There is no teaching in this patent of any combining of the satellite signals and the terrestrial antenna signals at the antenna receiving head.<br><br>Petruzzelli at 5:25–34:<br><br>The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna.<br><br>Petruzzelli at 5:38–45:<br><br>The present invention is directed primarily to a satellite parabolic antenna which has an LNB mounted within a housing and located at the focal point of the antenna. A wave guide collects the incoming RF radio frequency energy and directs the signal to a plurality of individual antenna probes. For the sake of illustration, the probes as disclosed and discussed herein are arranged for reception of right and left hand polarized incoming RF signals.<br><br>Petruzzelli at 5:46–61:<br><br>For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a |

| Asserted Claims | Petruzzelli |
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| | separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter.<br><br>Petruzzelli at 5:62–6:21:<br><br>In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver.<br><br>Petruzzelli at 7:63–8:39:<br><br>Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained |

| Asserted Claims | Petruzzelli |
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| | within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement.<br><br>'715 patent at 2:32–45:<br><br>U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a |

| Asserted Claims | Petruzzelli |
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| | bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable.<br><br>To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Petruzzelli discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Petruzzelli at 1:63–2:14:<br><br>Direct satellite broadcast systems generally use line-of-sight microwave and ultra high frequency (UHF) RF transmissions. In this part of the spectrum, radio frequency power losses associated with both feed lines and connectors are of major concern. This concern stems from the fact that at these high frequencies major loss of the signal can occur during the hard wire transmission of the signal through connectors and a coaxial cable from the antenna outside of the building to the receiver and TV located within the home or building. It is always a major concern to minimize these losses and to do it in an economical manner. As a result, it has been found that it is more economical and provides better results, if the frequency of the incoming received RF signal is down converted from the received microwave or ultra high frequency source to a lower intermediate frequency which can be transmitted more easily and efficiently over lower cost coaxial cable. As a |

| Asserted Claims | Petruzzelli |
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| | result, various methods have been attempted in the past to provide these more efficient transmitting arrangements.<br><br>Petruzzelli at 2:53–3:27:<br><br>Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13 Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner |

| Asserted Claims | Petruzzelli |
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| | carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure.<br><br>Petruzzelli at 3:42–52:<br><br>The diagram at the lower portion of FIG. 1, illustrates the frequency bands of the RF signals which are transmitted through the interface 21 from the exterior of the structure to the appropriate location where the equipment is located within the structure. The VHF band is relatively narrow in comparison with the UHF bands being broader in bandwidth. The signals received from the satellite include the direct broadcast satellite signals which can have left hand and right hand circular polarization. As shown, the bandwidth of these signals are considerably broader than those of the VHF and UHF signals.<br><br>Petruzzelli at 3:53–56:<br><br>As illustrated herein, the prior art commonly provides a plurality of cables for conveying the signals from various RF sources to the appropriate converters or receivers within the structure where they can be satisfactorily used.<br><br>Petruzzelli at 4:47–58:<br><br>The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system.<br><br>Petruzzelli at 5:1–15: |

| Asserted Claims | Petruzzelli |
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| | The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing.<br><br>Petruzzelli at 5:25–34:<br><br>The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna.<br><br>Petruzzelli at 5:46–61:<br><br>For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local |

| Asserted Claims | Petruzzelli |
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| | oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter.<br><br>Petruzzelli at 5:62–6:21:<br><br>In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver.<br><br>Petruzzelli at 6:37–50:<br><br>By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the |

| Asserted Claims | Petruzzelli |
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| | other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception.<br><br>Petruzzelli at 7:63–8:39:<br><br>Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of |

| Asserted Claims | Petruzzelli |
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| | approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement.<br><br>'715 patent at 2:32–45:<br><br>U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable.<br><br>To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Petruzzelli discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Petruzzelli at 1:1–17:<br><br>This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the |

| Asserted Claims | Petruzzelli |
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| | electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver.<br><br>Petruzzelli at 3:57–62:<br><br>The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install.<br><br>Petruzzelli at 4:4–23:<br><br>The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver.<br><br>Petruzzelli at 4:47–58:<br><br>The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined |

| Asserted Claims | Petruzzelli |
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| | and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system.<br><br>Petruzzelli at 5:16–24:<br><br>The Japanese patent to Yoshida (patent No. 5-129977) discloses a circuit which allows plural satellite broadcast receivers. A plurality of input antennas covering both satellite transmissions as well as UHF/VHF TV antenna signals are connected through various band pass filters to a mixer for connection to a tuner or a receiver. This patent does not in any way disclose the combination of a diplexer for combining UHF/VHF TV antenna signals with the output signals from a satellite antenna.<br><br>Petruzzelli at 5:25–34:<br><br>The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna.<br><br>Petruzzelli at 5:46–61:<br><br>For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a |

| Asserted Claims | Petruzzelli |
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| | separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter.<br><br>Petruzzelli at 5:62–6:21:<br><br>In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver.<br><br>Petruzzelli at 6:22–36:<br><br>This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for |

| Asserted Claims | Petruzzelli |
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| | the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream.<br><br>Petruzzelli at 7:63–8:39:<br><br>Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of |

| Asserted Claims | Petruzzelli |
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| | 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement.<br><br>Petruzzelli at 8:40–53:<br><br>The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78.<br><br>Petruzzelli at 8:54–61:<br><br>The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2.<br><br>Petruzzelli at 8:62–9:13:<br><br>The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and |

| Asserted Claims | Petruzzelli |
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| | distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal 95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38.<br><br>Petruzzelli at 9:14–31:<br><br>The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor.<br><br>Petruzzelli at 9:65–10:10:<br><br>It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band |

| Asserted Claims | Petruzzelli |
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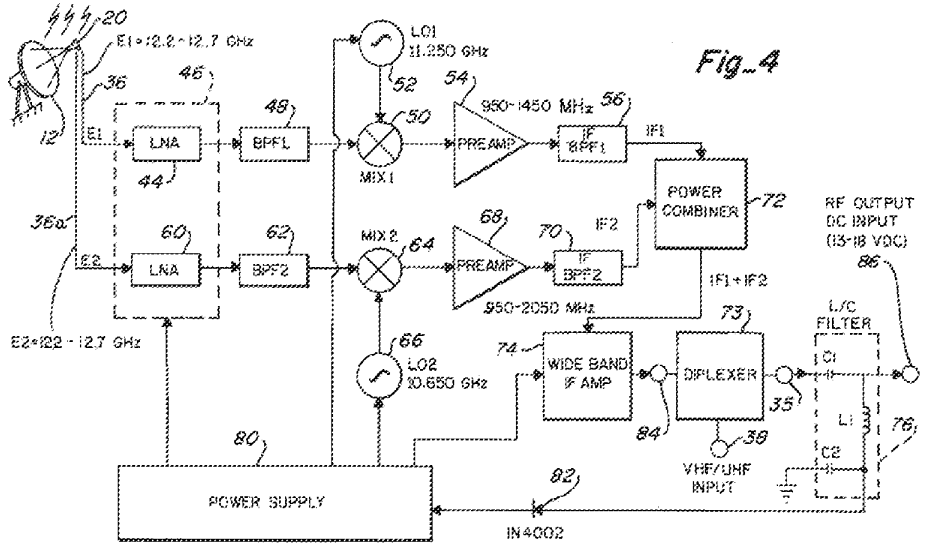
| | frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system.<br><br>Petruzzelli at Fig. 4:<br><br>  <br><br><br>'715 patent at 2:32–45:<br><br>U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, |

| Asserted Claims | Petruzzelli |
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| | are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable.<br><br>To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Petruzzelli discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Petruzzelli at 3:57–62:<br><br>The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install.<br><br>Petruzzelli at 4:4–23:<br><br>The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals |

| Asserted Claims | Petruzzelli |
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| | are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver.<br><br>Petruzzelli at 4:24--46:<br><br>The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial received signals and the combined signal is then transmitted through a single cable to a converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite signals for producing a stacked band of frequencies for transmission through the single lead-in cable. |

| Asserted Claims | Petruzzelli |
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| | Petruzzelli at 4:59–68:<br><br>The Oleson patent (U.S. Pat. No. 4,675,732) discloses the processing of an incoming satellite antenna signal in a low noise block down converter mounted at the antenna. The output of the LNB is delivered to a splitter where it is divided into various individual signals. The satellite incoming signals can be combined with local UHF/VHF TV signals in a matrix and selectively distributed to attached TV sets. There is no teaching in this patent of any combining of the satellite signals and the terrestrial antenna signals at the antenna receiving head.<br><br>Petruzzelli at 5:25–34:<br><br>The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna.<br><br>Petruzzelli at 8:54–61:<br><br>The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2.<br><br>Petruzzelli at 9:47–57:<br><br>A common L/C filter 76 at the output of the diplexer 78 allows the IF signal to pass to the housing output connector 86. The coaxial cable 22 connected between the connector 86 |

| Asserted Claims | Petruzzelli |
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| | and the satellite receiver provided within the protection of the home or structure provides a source of unregulated DC voltage of approximately 13-18 volts DC. This voltage is applied through the RF output connector 86. This voltage passes directly to the L/C filter 76 where the DC voltage is blocked by capacitor C1 and passes through the L1/C2 portion of the filter 76 and through the diode 82 to the power supply 80.<br><br>Petruzzelli at 9:65–10:10:<br><br>It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system.<br><br>Petruzzelli at Fig. 4: |

| Asserted Claims | Petruzzelli |
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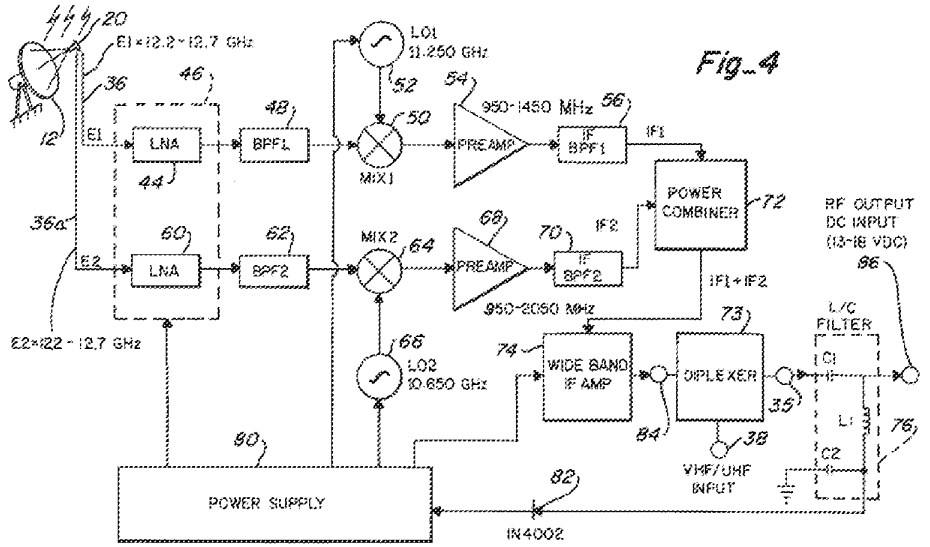
| |  <br>To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Petruzzelli discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art |

| Asserted Claims | Petruzzelli |
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| | in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Petruzzelli discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Petruzzelli discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

**Exhibit B12 – Williams '419 Invalidity Claim Chart**

## INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Williams '419

U.S. Patent No. 6,134,419 ("Williams '419")[2] was filed on January 20, 1998 and issued on October 17, 2000. Williams '419 therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Williams '419 invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Williams '419 |
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| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Williams '419 discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

[2] Williams '419 was incorporated by reference in the '715 patent. *See* '715 patent at 2:7–24.



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| Asserted Claims | Williams '419 |
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| | Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 1:10–15:<br><br>The present invention relates generally to signal distribution systems and, more particularly, to audio/visual/data signal distribution systems that distribute satellite signals typically in conjunction with standard terrestrial and/or cable signals to a plurality of individual receivers within one or more multiple dwelling units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between |

| Asserted Claims | Williams '419 |
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| | about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 2:41–55:<br><br>Furthermore, the receiving antennas or dishes associated with land-based or satellite-based wireless signal distribution systems are typically large and cumbersome. For example, C-band satellite dishes are generally in the range of four to five feet in diameter and, therefore, require a large amount of operating space. As a result, it can be difficult, if not practically impossible, to install a receiving antenna for each individual unit within a multiple dwelling unit (MDU), such as an apartment, condominium or townhome complex. Reception of a particular satellite signal is made even more difficult in MDUs when, as is generally the case, some of the individual dwelling units therein do not have any walls or outside exposure facing the direction in which the receiving antenna must be pointed, or these dwelling units are shadowed by surrounding buildings or other obstructions.<br><br>Williams '419 at 3:9–27: |

| Asserted Claims | Williams '419 |
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| | One system proposed by the European Telecommunications Standards Institute (ETSI) in the area of Satellite Master Antenna Television (SMATV) receives a QPSK modulated satellite television signal (which may be combined with terrestrial TV signals) and remodulates this signal according to a 64 quadrature amplitude modulation (64-QAM) technique. The SMATV system then sends this remodulated signal out over cable to one or more adjacent buildings. Likewise, U.S. Pat. No. 5,173,775 discloses a system that remodulates data portions of a satellite television signal from one modulation scheme to another, such as from FM to AM, for retransmission to subscribers. However, these systems do not specifically demonstrate how to propagate remodulated satellite signals and existing cable or terrestrial signals on the same cable line or other transmission channel in an efficient manner or demonstrate how to remodulate and broadcast a large number of transponder signals associated with one or more satellites over the same cable line or other transmission channel to one or more adjacent buildings.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 3:48–65: |

| Asserted Claims | Williams '419 |
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| | According to another aspect of the present invention, a signal distribution system that distributes first and second signals over a communication channel to a plurality of individual receivers includes a main receiver and a second receiver disposed at a local site for receiving the first and second signals, respectively. A transmodulator coupled to the main receiver transmodulates the first signal from a first modulation scheme, such as a QPSK modulation scheme, to a second modulation scheme, such as a 128-QAM modulation scheme, to produce a transmodulated third signal. A signal combiner coupled to the second receiver and to the transmodulator combines the transmodulated third signal at a first set of carrier frequency bands and the second signal at a second set of carrier frequency bands to produce a combined signal. A transmitter then transmits the combined signal over a cable or a wireless network in a manner capable of being received at the plurality of individual receivers.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47: |

| Asserted Claims | Williams '419 |
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| | According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 5:55–6:7:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM signals. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a |

| Asserted Claims | Williams '419 |
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| | transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '419 at 7:1–8:<br><br>Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 13:13–37:<br><br>Furthermore, while the signal distribution system 10 is described herein as using a 128-QAM modulator 102, any other type of QAM modulator, such as an 8-QAM, 32-QAM, or higher order QAM modulator can be used to encode the decoded satellite signal, with the choice being dependent on how much frequency spectrum is available on a particular cable system and on how noisy the cable network tends to be which, in turn, drives the level of error protection required. In general, the higher the order of QAM encoding, the less frequency spectrum will be necessary to transmit the desired number (e.g., 32) satellite transponder signals (or other signals) over a cable network. However, the higher the order of QAM modulation, the more the transmodulated signals will be susceptible to noise while being transmitted over a cable network. Likewise, different ones of the transmodulator channels of FIG. 3 may transmodulate the received PM signal, i.e., the tuned transponder signal, using different modulation schemes. For example, a first set of the transmodulator channels may remodulate PM signals using a 128-QAM modulation technique, while a second set of transmodulator channels may use a 32-QAM modulation technique, a 64-QAM modulation technique, and so on. The choice of the modulation technique for any particular transmodulator channel may depend on, for example, the data rate of the PM signal being received, as well as other factors.<br><br>Williams '419 at 13:38–54: |

| Asserted Claims | Williams '419 |
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| | Furthermore, as noted above, modulation techniques besides QAM can be used when transmodulating the decoded satellite signal. Other such modulation techniques may include, for example, any high rate digital modulation techniques such as VSB (vestigial side band), including 8-VSB, 16-VSB etc., or QAM with trellis-coded modulation. Other modulation techniques which may be developed in the future could similarly be used without departing from the spirit and scope of the present invention. In general, the choice of a modulation technique will be driven by the reduction in bandwidth which must be accomplished by the modulation technique and by the noise susceptibility of the modulation technique. If a different modulation technique is used, however, it is understood that a different type of cable encoder will be necessary to properly transmodulate the desired transponder signals (or other received signals) for propagation over the cable network 26.<br><br>Williams '419 at 13:55–14:3:<br><br>Likewise, it is understood that signals other than QPSK modulated signals can be received at the main signal receiver 14 (or other receiver) and transmodulated for delivery over the cable network 26 using the concepts described herein. In this situation, the particulars of the transmodulator 20 will change based on the type of modulation, carrier frequencies and transmission formats associated with these different received signals. It is considered that the use of an 8-PSK (phase shift keying) modulation scheme for encoding the satellite signal and a 16-QAM or higher order QAM (32-QAM, 64-QAM etc.) scheme for encoding the cable signal may be one useful combination. It is also considered that the use of a 16-QAM scheme for encoding the satellite signal and a 32-QAM or higher order QAM scheme for encoding the cable signal may be another useful combination.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of |

| Asserted Claims | Williams '419 |
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| | the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 1: |

| Asserted Claims | Williams '419 |
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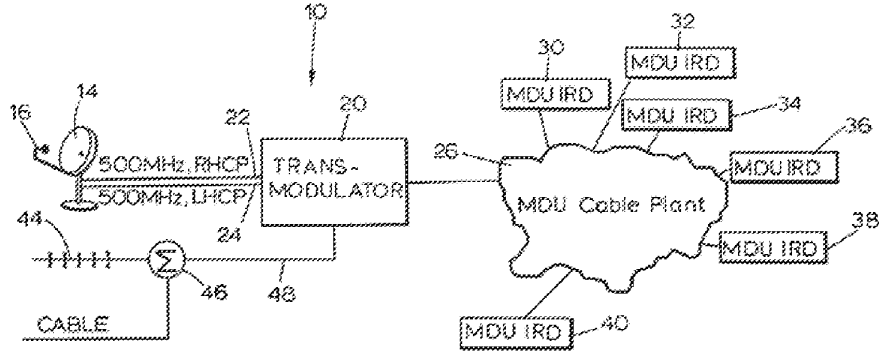
| |  <br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Williams '419 discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual |

| Asserted Claims | Williams '419 |
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| | program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 3:48–65:<br><br>According to another aspect of the present invention, a signal distribution system that distributes first and second signals over a communication channel to a plurality of individual receivers includes a main receiver and a second receiver disposed at a local site for receiving the first and second signals, respectively. A transmodulator coupled to the main receiver transmodulates the first signal from a first modulation scheme, such as a |

| Asserted Claims | Williams '419 |
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| | QPSK modulation scheme, to a second modulation scheme, such as a 128-QAM modulation scheme, to produce a transmodulated third signal. A signal combiner coupled to the second receiver and to the transmodulator combines the transmodulated third signal at a first set of carrier frequency bands and the second signal at a second set of carrier frequency bands to produce a combined signal. A transmitter then transmits the combined signal over a cable or a wireless network in a manner capable of being received at the plurality of individual receivers.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite |

| Asserted Claims | Williams '419 |
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| | signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 5:55–6:7:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM signals. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the |

| Asserted Claims | Williams '419 |
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| | transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 6:28–51:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those which locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '419 at 8:16–30:<br><br>Referring now to FIG. 3, the transmodulator 20 includes bias tees 50 and 52 that receive the RHCP and LHCP QPSK-modulated satellite signals, respectively, at L-band from the LNB 16 (FIG. 1). The bias tee 50 provides a 13 volt DC signal to the LNB channel associated with the RHCP satellite signals, while the bias tee 52 provides a 17 volt DC signal to the LNB channel associated with the LHCP satellite signal. These DC voltages |

| Asserted Claims | Williams '419 |
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| | provide power to the respective LNB circuitry and select the desired polarization state in manners well known in the art. In this manner, standard LNBs configured to select polarization states based on the applied DC control voltage may be utilized. Other forms of LNBs permanently configured to operate in desired manners may alternatively be utilized, eliminating the need for the bias tees 50 and 52.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in |

| Asserted Claims | Williams '419 |
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| | the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 9:56–67:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. The control unit 72 may control, for example, tuning parameters, such as the output frequencies of the tuners 54 and may select the frequencies used by the upconverters 62 and 66 and/or |

| Asserted Claims | Williams '419 |
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| | the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 10:63–11:10:<br><br>In the embodiment of FIG. 3, the control unit 72 preferably searches for continuous 24 MHz-wide unused frequency bands within which to place each of the eight groups of four, 6 MHz-wide signals developed by the summers 64. Alternatively, the control unit 72 could |

| Asserted Claims | Williams '419 |
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| | search for any smaller or larger continuous band of unused frequencies for use in transmitting any other desired groupings of the 32, 6 MHz-wide transmodulated signals. The control unit 72 may control the level shifter 70 to frequency-translate the terrestrial signals received at the frequency bands identified for use by the transmodulated signals in any conventional manner. Also, the control unit 72 may establish a communication channel with the IRDs 30-40 and signal the location, order, etc. of the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over this channel.<br><br>Williams '419 at 13:1–12:<br><br>While the transmodulator 20 is described herein as including a packetizer 58 which repacketizes 130 byte data packets produced by a standard DSS satellite decoder 56 into standard 188 byte data packets used by systems following the DVB transmission standard to enable the use of known DSS satellite decoders and known DVB cable encoders, the transmodulator 20 could, instead, include circuitry specifically designed to encode the 130 byte data packets produced by the satellite decoder 56 in a manner similar to the DVB cable encoder, i.e., by scrambling, R-S encoding, interleaving, etc. the 130 byte data packets to produce the 128-QAM modulated signals.<br><br>Williams '419 at 13:13–37:<br><br>Furthermore, while the signal distribution system 10 is described herein as using a 128-QAM modulator 102, any other type of QAM modulator, such as an 8-QAM, 32-QAM, or higher order QAM modulator can be used to encode the decoded satellite signal, with the choice being dependent on how much frequency spectrum is available on a particular cable system and on how noisy the cable network tends to be which, in turn, drives the level of error protection required. In general, the higher the order of QAM encoding, the less frequency spectrum will be necessary to transmit the desired number (e.g., 32) satellite transponder signals (or other signals) over a cable network. However, the higher the order of QAM modulation, the more the transmodulated signals will be susceptible to noise while being transmitted over a cable network. Likewise, different ones of the transmodulator channels of FIG. 3 may transmodulate the received PM signal, i.e., the |

| Asserted Claims | Williams '419 |
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| | tuned transponder signal, using different modulation schemes. For example, a first set of the transmodulator channels may remodulate PM signals using a 128-QAM modulation technique, while a second set of transmodulator channels may use a 32-QAM modulation technique, a 64-QAM modulation technique, and so on. The choice of the modulation technique for any particular transmodulator channel may depend on, for example, the data rate of the PM signal being received, as well as other factors.<br><br>Williams '419 at 13:55–14:3:<br><br>Likewise, it is understood that signals other than QPSK modulated signals can be received at the main signal receiver 14 (or other receiver) and transmodulated for delivery over the cable network 26 using the concepts described herein. In this situation, the particulars of the transmodulator 20 will change based on the type of modulation, carrier frequencies and transmission formats associated with these different received signals. It is considered that the use of an 8-PSK (phase shift keying) modulation scheme for encoding the satellite signal and a 16-QAM or higher order QAM (32-QAM, 64-QAM etc.) scheme for encoding the cable signal may be one useful combination. It is also considered that the use of a 16-QAM scheme for encoding the satellite signal and a 32-QAM or higher order QAM scheme for encoding the cable signal may be another useful combination.<br><br>Williams '419 at 14:11–26:<br><br>The IRD 30 may initially scan all the channels from, for example, low carrier frequencies to high carrier frequencies, to locate the frequency bands or channels used by the 32 transmodulated signals and then assign channel numbers to these located signals based on a predetermined ordering scheme used by the transmodulator 20. However, the transmodulator 20 may actively signal the channel locations, ordering, frequency assignments, etc. of the transmodulated satellite signals and/or terrestrial signals via a communication channel established over, for example, the cable network 26. Such a communication channel may comprise a low-speed channel that uses uncoded bits of the sync and error code bytes within the, for example, 188 byte data packets, and may be used |

| Asserted Claims | Williams '419 |
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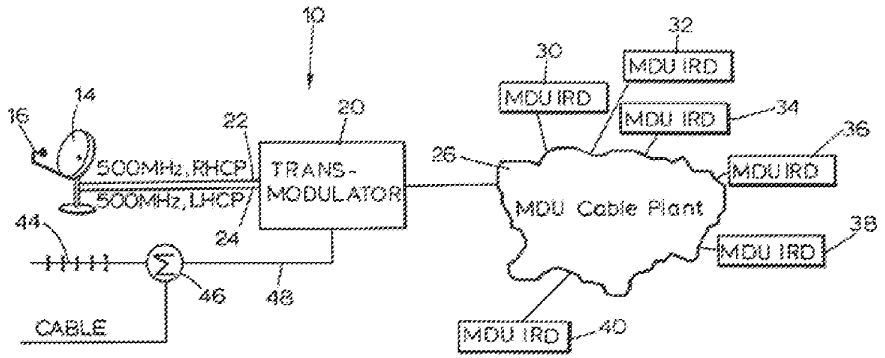
| | to deliver any desired information to the IRD 30 over time, i.e., using a large number of the 188 byte data packets.<br><br>Williams '419 at Fig. 1:<br><br>  <br><br><br>FIG. 1<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of | Williams '419 discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '419 |
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| transponder signals from at least one broadband LNB signal based on the transponder select information; | Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified |

| Asserted Claims | Williams '419 |
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| | channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 6:52–67:<br><br>Preferably, the transmodulator 20 transmodulates the two 500 MHz-wide QPSK-modulated downlink signals into a 128-QAM-modulated signal having 32, 6 MHz-wide channels, wherein each of the 6 MHz-wide channels corresponds to one of the 32 original transponder signals. The transmodulator 20 may then place each of these 32, 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate the received satellite signals. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '419 at 7:1–8: |

| Asserted Claims | Williams '419 |
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| | Each of the IRDs 30-40 receives the 32, QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates at least a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:56–67:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. The control unit 72 may control, for example, tuning parameters, such as the output frequencies of the tuners 54 and may select the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are |

| Asserted Claims | Williams '419 |
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| | received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:28–33:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Williams '419 discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other |

| Asserted Claims | Williams '419 |
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| | transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the |

| Asserted Claims | Williams '419 |
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| | transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all |

| Asserted Claims | Williams '419 |
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| | of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same |

| Asserted Claims | Williams '419 |
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| | modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter |

| Asserted Claims | Williams '419 |
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| | 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte |

| Asserted Claims | Williams '419 |
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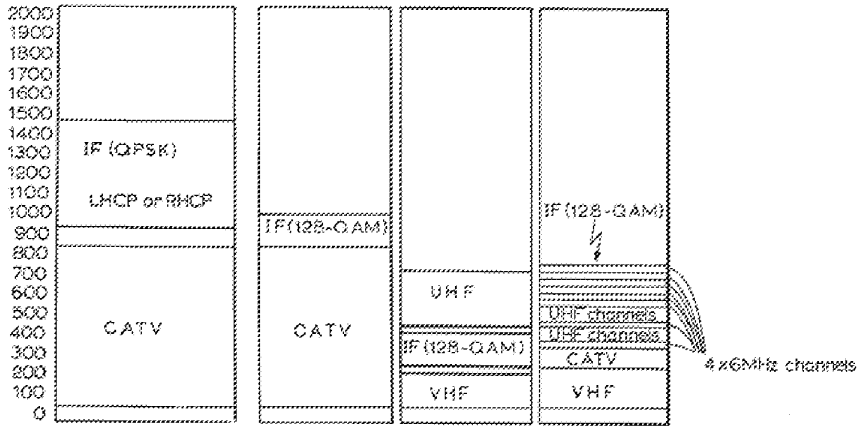
| | data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2:<br><br>  <br><br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Williams '419 |
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| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Williams '419 discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is |

| Asserted Claims | Williams '419 |
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| | smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated |

| Asserted Claims | Williams '419 |
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| | signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 5:25–40:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '419 at 7:9–36:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component |

| Asserted Claims | Williams '419 |
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| | of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a standard cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '419 at 7:37–46:<br><br>The three right-most columns of FIG. 2 illustrate methods of combining the 32, 6 MHz-wide, 128-QAM-modulated signals with existing terrestrial signals on the cable network 26. The second left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals in sequence at a band between about 806 MHz and 998 MHz directly above the common CATV channels. This configuration can be used with higher grade cable networks that propagate signals at up to 1000 MHz without significant degradation.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier |

| Asserted Claims | Williams '419 |
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| | frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Williams '419 discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Williams '419 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme to reduce the bandwidth of the broadband signal. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display. A dual mode receiver is compatible with the MDU system and with a |

| Asserted Claims | Williams '419 |
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| | known digital satellite system commonly used in single family housing (SFH). An adapter enables a standard SFH receiver used in a digital satellite system to be compatible with the MDU system.<br><br>Williams '419 at 1:10–15:<br><br>The present invention relates generally to signal distribution systems and, more particularly, to audio/visual/data signal distribution systems that distribute satellite signals typically in conjunction with standard terrestrial and/or cable signals to a plurality of individual receivers within one or more multiple dwelling units.<br><br>Williams '419 at 3:30–47:<br><br>The present invention relates to a system and method for distributing a set of program multiplexed A-V signals and existing terrestrial signals to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates the broadband signal into a modulated signal having a bandwidth which is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc.<br><br>Williams '419 at 4:13–32:<br><br>According to another aspect of the present invention, a signal distribution system distributes a composite signal modulated according to a first modulation scheme over a cable or a wireless network in a manner capable of being received by a plurality of individual receivers at a local site. The composite signal includes a plurality of program |

| Asserted Claims | Williams '419 |
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| | multiplex (PM) signals wherein each PM signal includes data related to a number of audio, video, and/or data signals. The signal distribution system includes a main receiver for receiving the composite signal and a plurality of transmodulator channels coupled to the main receiver, each of which transmodulates one of the plurality of PM signals from the first modulation scheme to a second modulation scheme to produce one of a plurality of transmodulated signals. A combiner combines the plurality of transmodulated signals at different carrier frequency bands to produce a combined signal and, thereafter, a transmitter transmits the combined signal over the cable or wireless network in a manner capable of being received by the plurality of individual receivers at the local site.<br><br>Williams '419 at 4:33–47:<br><br>According to a further aspect of the present invention, a single dual mode IRD unit can be used in an MDU system of this invention and also is compatible with satellite signal distribution systems currently used predominantly in a single family home (SFH). The single dual mode IRD receives the transmodulated signals and demodulates a selected one of the transmodulated signals in an MDU signal distribution system of this invention. The dual mode IRD also is capable of receiving modulated signals in a known SFH satellite signal distribution system and demodulating a selected one of the received modulated signals. In important embodiments, the transmodulated signals and the SFH signals utilize different modulation schemes, and the dual mode IRD is capable of selectively demodulating both such modulation schemes.<br><br>Williams '419 at 4:48–54:<br><br>Accordingly, apartment dwellers, for instance within a MDU system of this invention, can still use the dual mode IRD of the present invention if they move within a currently available SFH system, and conversely, single family home dwellers can still use the dual mode IRD of the present invention if they move within a MDU system of this invention.<br><br>Williams '419 at 4:55–61: |

| Asserted Claims | Williams '419 |
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| | In a still further aspect of this invention, an MDU adapter enables a presently available IRD used within a current signal distribution system for SFHs (SFH IRD), to be compatible with a signal distribution system for MDUs of this invention. The MDU adapter demodulates a selected one of the received MDU network signals and modulates the selected signal in a manner compatible with the SFH IRD.<br><br>Williams '419 at 5:55–6:7:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM signals. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '419 at 6:52–67:<br><br>Preferably, the transmodulator 20 transmodulates the two 500 MHz-wide QPSK-modulated downlink signals into a 128-QAM-modulated signal having 32, 6 MHz-wide channels, wherein each of the 6 MHz-wide channels corresponds to one of the 32 original transponder signals. The transmodulator 20 may then place each of these 32, 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate the received satellite |

| Asserted Claims | Williams '419 |
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| | signals. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 13:13–37:<br><br>Furthermore, while the signal distribution system 10 is described herein as using a 128-QAM modulator 102, any other type of QAM modulator, such as an 8-QAM, 32-QAM, or higher order QAM modulator can be used to encode the decoded satellite signal, with the choice being dependent on how much frequency spectrum is available on a particular cable system and on how noisy the cable network tends to be which, in turn, drives the level of error protection required. In general, the higher the order of QAM encoding, the less frequency spectrum will be necessary to transmit the desired number (e.g., 32) satellite transponder signals (or other signals) over a cable network. However, the higher the order of QAM modulation, the more the transmodulated signals will be susceptible to noise while being transmitted over a cable network. Likewise, different ones of the transmodulator channels of FIG. 3 may transmodulate the received PM signal, i.e., the tuned transponder signal, using different modulation schemes. For example, a first set of the transmodulator channels may remodulate PM signals using a 128-QAM modulation |

| Asserted Claims | Williams '419 |
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| | technique, while a second set of transmodulator channels may use a 32-QAM modulation technique, a 64-QAM modulation technique, and so on. The choice of the modulation technique for any particular transmodulator channel may depend on, for example, the data rate of the PM signal being received, as well as other factors.<br><br>Williams '419 at 13:38–54:<br><br>Furthermore, as noted above, modulation techniques besides QAM can be used when transmodulating the decoded satellite signal. Other such modulation techniques may include, for example, any high rate digital modulation techniques such as VSB (vestigial side band), including 8-VSB, 16-VSB etc., or QAM with trellis-coded modulation. Other modulation techniques which may be developed in the future could similarly be used without departing from the spirit and scope of the present invention. In general, the choice of a modulation technique will be driven by the reduction in bandwidth which must be accomplished by the modulation technique and by the noise susceptibility of the modulation technique. If a different modulation technique is used, however, it is understood that a different type of cable encoder will be necessary to properly transmodulate the desired transponder signals (or other received signals) for propagation over the cable network 26.<br><br>Williams '419 at 13:55–14:3:<br><br>Likewise, it is understood that signals other than QPSK modulated signals can be received at the main signal receiver 14 (or other receiver) and transmodulated for delivery over the cable network 26 using the concepts described herein. In this situation, the particulars of the transmodulator 20 will change based on the type of modulation, carrier frequencies and transmission formats associated with these different received signals. It is considered that the use of an 8-PSK (phase shift keying) modulation scheme for encoding the satellite signal and a 16-QAM or higher order QAM (32-QAM, 64-QAM etc.) scheme for encoding the cable signal may be one useful combination. It is also considered that the use of a 16-QAM scheme for encoding the satellite signal and a 32-QAM or higher order QAM scheme for encoding the cable signal may be another useful combination. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 1: |

| Asserted Claims | Williams '419 |
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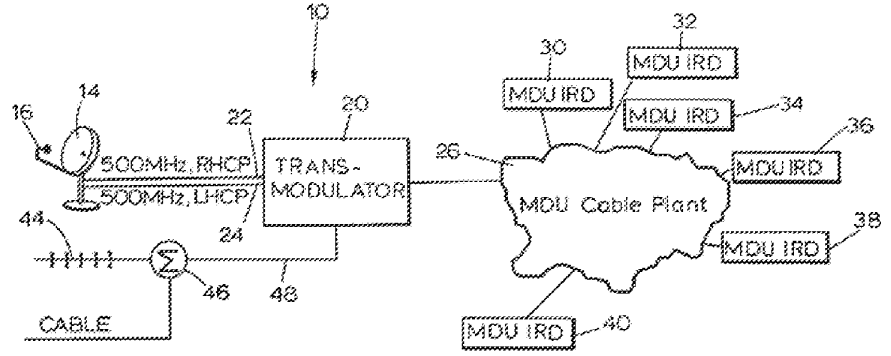
| |  <br>FIG. 1<br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Williams '419 discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output.<br><br>*See* claim 9, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:29–43: |

| Asserted Claims | Williams '419 |
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| | Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between |

| Asserted Claims | Williams '419 |
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| | about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the |

| Asserted Claims | Williams '419 |
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| | transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate |

| Asserted Claims | Williams '419 |
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| | frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62: |

| Asserted Claims | Williams '419 |
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| | If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error |

| Asserted Claims | Williams '419 |
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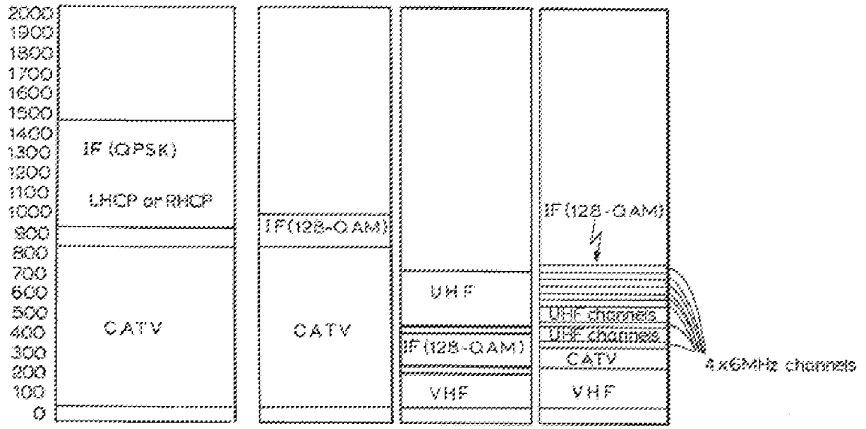
| | during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2:<br><br>  <br><br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation | Williams '419 discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. |

| Asserted Claims | Williams '419 |
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| table is communicated to devices in the network. | *See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and |

| Asserted Claims | Williams '419 |
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| | correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band. |

| Asserted Claims | Williams '419 |
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| | Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network |

| Asserted Claims | Williams '419 |
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| | 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43: |

| Asserted Claims | Williams '419 |
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| | The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM |

| Asserted Claims | Williams '419 |
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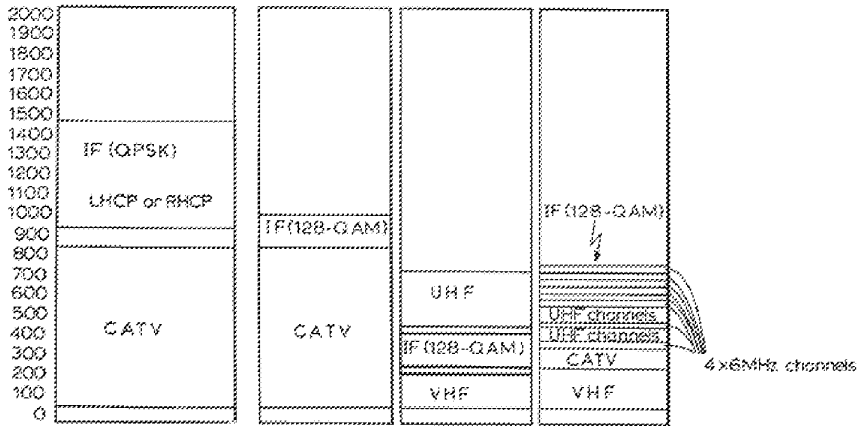
| | demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2:<br>  <br><br>FIG. 2 |

| Asserted Claims | Williams '419 |
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| | To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Williams '419 discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*:<br><br>Williams '419 at 1:29–43:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '419 at 1:60–2:10:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in operation |

| Asserted Claims | Williams '419 |
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| | uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '419 at 2:11–21:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '419 at 2:22–40:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as |

| Asserted Claims | Williams '419 |
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| | RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '419 at 6:8–27:<br><br>The transmodulator 20 remodulates or transmodulates the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to, for example, a single band of 192 MHz. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '419 at 7:47–61:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency |

| Asserted Claims | Williams '419 |
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| | distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 750 MHz without significant degradation.<br><br>Williams '419 at 8:42–50:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to base-band.<br><br>Williams '419 at 9:12–24:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of eight summers 64 associated with the transmodulator 20.<br><br>Williams '419 at 9:25–40:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of the eight groups of four, 6 MHz-wide transmodulated signals illustrated in the right-most column of FIG. 2. The eight summers 64 of FIG. 3 provide eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the eight groups of four, 6 MHz-wide signals to a different carrier |

| Asserted Claims | Williams '419 |
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| | frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '419 at 9:41–55:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g. local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26. Preferably, such transmodulated terrestrial signals will be transmodulated to the same modulation scheme as the transmodulated satellite signals to simplify decoding of the transmodulated terrestrial signals.<br><br>Williams '419 at 10:1–27:<br><br>In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the 32 transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and |

| Asserted Claims | Williams '419 |
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| | gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '419 at 10:34–43:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the 32 transmodulated signals and, if so, identify that band for use by a specific one or more of the transponder signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all 32 of the transmodulated signals.<br><br>Williams '419 at 10:44–62:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired (e.g., 32) transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the 32 transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for |

| Asserted Claims | Williams '419 |
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| | elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '419 at 14:27–54:<br><br>The IRD 30 includes a down-converter and tuner 110 connected to the cable network 26. The down-converter is used, if necessary, to shift higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. The tuner 110 is responsive to a controller (not shown) and tunes to the frequency band associated with a selected one of the 6 MHz-wide transmodulated signals. The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '419 at Fig. 2: |

| Asserted Claims | Williams '419 |
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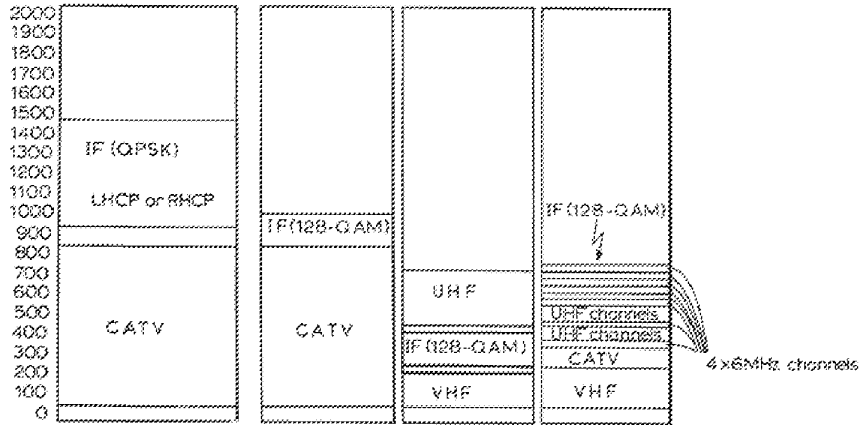
| |  <br>FIG. 2<br><br>To the extent Williams '419 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '419 alone or it would have been obvious to combine Williams '419 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

# INVALIDITY CLAIM CHART[1]
## Invalidity of U.S. Patent No. 7,542,715 in view of Williams '873

U.S. Patent No. 6,493,873 ("Williams '873") was filed on January 20, 1998 and issued on December 10, 2002. Williams '873 therefore qualifies as prior art to the '715 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Williams '873 invalidates the asserted claims of the '715 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix B, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

| Asserted Claims | Williams '873 |
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| 9[pre] 9. A signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU) comprising: | Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Williams '873 discloses, explicitly and/or inherently, a signal distribution system for distributing a plurality of low noise amplifier and block converter (LNB) output signals from a satellite outdoor unit (ODU).<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract: |

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '715 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

| Asserted Claims | Williams '873 |
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| | A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because |

| Asserted Claims | Williams '873 |
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| | cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '873 at 2:45–59:<br><br>Furthermore, the receiving antennas or dishes associated with land-based or satellite-based wireless signal distribution systems are typically large and cumbersome. For example, C-band satellite dishes are generally in the range of four to five feet in diameter and, therefore, require a large amount of operating space. As a result, it can be difficult, if not practically impossible, to install a receiving antenna for each individual unit within a multiple dwelling unit (MDU), such as an apartment, condominium or townhome complex. Reception of a particular satellite signal is made even more difficult in MDUs when, as is generally the case, some of the individual dwelling units therein do not have any walls or outside exposure facing the direction in which the receiving antenna must be pointed, or these dwelling units are shadowed by surrounding buildings or other obstructions.<br><br>Williams '873 at 3:13–32:<br><br>One system proposed by the European Telecommunications Standards Institute (ETSI) in the area of Satellite Master Antenna Television (SMATV) receives a QPSK modulated satellite television signal (which may be combined with terrestrial TV signals) and remodulates this signal according to a 64 quadrature amplitude modulation (64-QAM) technique. The SMATV system then sends this remodulated signal out over cable to one or more adjacent buildings. Likewise, U.S. Pat. No. 5,173,775 discloses a system that remodulates data portions of a satellite television signal from one modulation scheme to another, such as from FM to AM, for retransmission to subscribers. However, these systems do not specifically demonstrate how to propagate remodulated satellite signals and existing cable or terrestrial signals on the same cable line or other transmission channel in an efficient manner or demonstrate how to remodulate and broadcast a large number of |

| Asserted Claims | Williams '873 |
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| | transponder signals associated with one or more satellites over the same cable line or other transmission channel to one or more adjacent buildings.<br><br>Williams '873 at 3:33–47:<br><br>The above-identified parent application discloses a signal redistribution system that transmodulates each of, for example, 32 received satellite transponder signals into a different modulation scheme and transmits each of these transmodulated signals, along with standard terrestrial signals, to each of a set of receivers within an MDU. The transmodulator disclosed in this application includes a separate channel having a satellite signal demodulator coupled to a signal remodulator for each of the received satellite transponder signals. As a result, this transmodulator unit tends to be expensive, especially when used in an MDU which includes fewer satellite signal receivers or subscribers than there are channels in the transmodulator unit, i.e., in MDUs that will never need all of the channels provided by the transmodulator unit.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which |

| Asserted Claims | Williams '873 |
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| | uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute |

| Asserted Claims | Williams '873 |
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| | the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the |

| Asserted Claims | Williams '873 |
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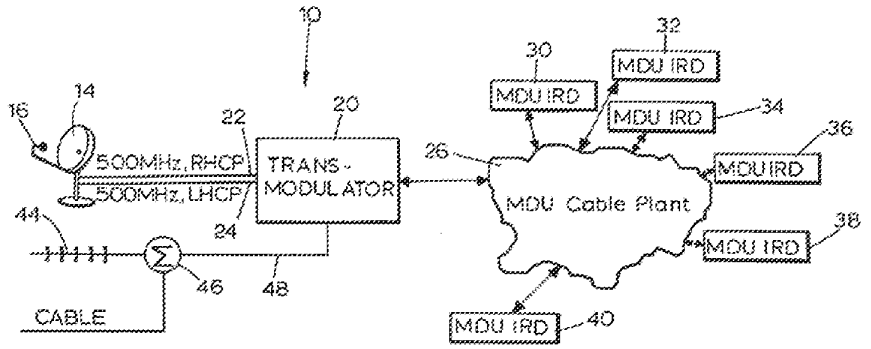
| | transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at Fig. 1:<br><br>  <br><br><br>FIG. 1<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Williams '873 |
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| 9[a] a gateway in communication with the ODU and at least one set top box (STB); | Williams '873 discloses, explicitly and/or inherently, a gateway in communication with the ODU and at least one set top box (STB).<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 3:33–47:<br><br>The above-identified parent application discloses a signal redistribution system that transmodulates each of, for example, 32 received satellite transponder signals into a different modulation scheme and transmits each of these transmodulated signals, along with standard terrestrial signals, to each of a set of receivers within an MDU. The transmodulator disclosed in this application includes a separate channel having a satellite signal demodulator coupled to a signal remodulator for each of the received satellite transponder signals. As a result, this transmodulator unit tends to be expensive, especially when used in an MDU which includes fewer satellite signal receivers or subscribers than there are channels in the transmodulator unit, i.e., in MDUs that will never need all of the channels provided by the transmodulator unit. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 4:4–15:<br><br>According to another aspect of the present invention, a signal distribution system adapted to receive a composite signal having a multiplicity of transponder signals therein includes a transmodulator that transmodulates a selected one of the transponder signals from a first modulation scheme to a second modulation scheme to produce a transmodulated signal and a transmitter that transmits the transmodulated signal over a communication channel to a plurality of individual receivers. A receiver receives a request signal from each of the plurality of individual receivers and a controller selects the selected transponder signal in response to the request signals.<br><br>Williams '873 at 4:16–38: |

| Asserted Claims | Williams '873 |
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| | According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 5:59–6:11: |

| Asserted Claims | Williams '873 |
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| | The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the |

| Asserted Claims | Williams '873 |
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| | transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the |

| Asserted Claims | Williams '873 |
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| | transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 9:28–39:<br><br>In accordance with the present invention, the number of transmodulator channels is less than the number of transponder signals associated with the received satellite or other signal and, in a preferred embodiment, the transmodulator 20 includes up to, but less than, 32 transmodulator channels, each of which includes a switch 53, a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 received transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the transmodulator channels will be described herein.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches |

| Asserted Claims | Williams '873 |
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| | 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:22–35:<br><br>If desired, the control unit 72 may provide a signal via side data to each of the IRDs 30-40 specifying which transponder signals are being transmodulated and transmitted over the cable network 26 and the frequencies at which the transmodulated transponder signals are located on the cable network 26. Also, if desired, when the control unit 72 receives |

| Asserted Claims | Williams '873 |
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| | requests for more transponder signals than there are transmodulator channels, the control unit 72 may send a signal to one or more of the IRDs 30-40 indicating that the requested signal cannot be decoded at, the present time because all of the transmodulator channels are being used to transmodulate other transponder signals. This communication may be performed using the cable network 26 or using any other wire or wireless network.<br><br>Williams '873 at 14:26–37:<br><br>While the transmodulator 20 is described herein as including a packetizer 58 which repacketizes 130 byte data packets produced by a standard DSS satellite decoder 56 into standard 188 byte data packets used by systems following the DVB transmission standard to enable the use of known DSS satellite decoders and known DVB cable encoders, the transmodulator 20 could, instead, include circuitry specifically designed to encode the 130 byte data packets produced by the satellite decoder 56 in a manner similar to the DVB cable encoder, i.e., by scrambling, R-S encoding, interleaving, etc. the 130 byte data packets to produce the 128-QAM modulated signals.<br><br>Williams '873 at 14:38–64:<br><br>Furthermore, while the signal distribution system 10 is described herein as using a 128-QAM modulator 102, any other type of QAM modulator, such as an 8-QAM, 16-QAM, 32-QAM, 64-QAM or higher order QAM modulator can be used to encode the decoded satellite signal, with the choice being dependent on how much frequency spectrum is available on a particular cable system, on how noisy the cable network tends to be which, in turn, drives the level of error protection required and on how many transmodulated signals are being delivered to the receiver units. In general, the higher the order of QAM encoding, the less frequency spectrum will be necessary to transmit the desired number satellite transponder signals (or other signals) over a cable network. However, the higher the order of QAM modulation, the more the transmodulated signals will be susceptible to noise while being transmitted over a cable network. Likewise, different ones of the transmodulator channels of FIG. 3 may transmodulate the received PM signal, i.e., the tuned transponder signal, using different modulation schemes. For example, a first set of |

| Asserted Claims | Williams '873 |
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| | the transmodulator channels may remodulate PM signals using a 128-QAM modulation technique, while a second set of transmodulator channels may use a 32-QAM modulation technique, a 64-QAM modulation technique, and so on. The choice of the modulation technique for any particular transmodulator channel may depend on, for example, the data rate of the PM signal being received, as well as other factors.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 15:28–45:<br><br>Likewise, it is understood that signals other than QPSK modulated signals can be received at the main signal receiver 14 (or other receiver) and transmodulated for delivery over the cable network 26 using the concepts described herein. In this situation, the particulars of the transmodulator 20 will change based on the type of modulation, carrier frequencies and transmission formats associated with these different received signals. It is considered that the use of an 8-PSK (phase shift keying) modulation scheme for encoding the satellite signal and a 16-QAM or higher order QAM (32-QAM, 64-QAM etc.) scheme for encoding the cable signal may be one useful combination. It is also considered that the use of a 16-QAM scheme for encoding the satellite signal and a 32-QAM or higher order QAM scheme for encoding the cable signal may be another useful combination.<br><br>Williams '873 at 15:53–16:4: |

| Asserted Claims | Williams '873 |
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| | The IRD 30 may initially scan all the channels from, for example, low carrier frequencies to high carrier frequencies, to locate the frequency bands or channels used by the selected ones of the transmodulated signals and then assign channel numbers to these located signals based on a predetermined ordering scheme used by the transmodulator 20. However, as noted above, the transmodulator 20 may actively signal the channel locations, ordering, frequency assignments, etc. of the transmodulated satellite signals and/or terrestrial signals via a communication channel (using side data) established over, for example, the cable network 26. Such a communication channel may comprise a low-speed channel that uses uncoded bits of the sync and error code bytes within the, for example, 188 byte data packets, and may be used to deliver any desired information to the IRD 30 over time, i.e., using a large number of the 188 byte data packets.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

| Asserted Claims | Williams '873 |
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| 9[b] a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information; | Williams '873 discloses, explicitly and/or inherently, a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information.<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard |

| Asserted Claims | Williams '873 |
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| | terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 4:4–15:<br><br>According to another aspect of the present invention, a signal distribution system adapted to receive a composite signal having a multiplicity of transponder signals therein includes a transmodulator that transmodulates a selected one of the transponder signals from a first modulation scheme to a second modulation scheme to produce a transmodulated signal and a transmitter that transmits the transmodulated signal over a communication channel to a plurality of individual receivers. A receiver receives a request signal from each of the plurality of individual receivers and a controller selects the selected transponder signal in response to the request signals.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 6:35–46:<br><br>In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or |

| Asserted Claims | Williams '873 |
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| | transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire |

| Asserted Claims | Williams '873 |
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| | network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, |

| Asserted Claims | Williams '873 |
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| | as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:1–6:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 |

| Asserted Claims | Williams '873 |
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| | with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[c] a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals; and | Williams '873 discloses, explicitly and/or inherently, a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:32–46:<br><br>Some wireless signal distribution systems use one or more geosynchronous satellites to broadcast a broadband A-V signal to receiving units within a large geographic area while other wireless systems are land-based, using one or more land-based transmitters to broadcast to individual receiver units within smaller geographic areas or cells. A satellite A-V signal distribution system generally includes an earth station that compiles a number of individual A-V programs into a broadband signal, modulates a carrier frequency band with the broadband signal and then transmits (uplinks) the modulated signal to one or more geosynchronous satellites. The satellites amplify the received signals, shift the signals to different carrier frequency bands and transmit (downlink) the frequency shifted signals to earth for reception at individual receiving units.<br><br>Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder |

| Asserted Claims | Williams '873 |
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| | signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 2:15–25:<br><br>At the individual receiver units, a receiving antenna, typically comprising a parabolic dish antenna, is pointed in the general direction of the transmitting satellite (or other transmitting location) to receive the broadband QPSK modulated multiplex of A-V signals. Typically, such antennas include a low noise block (LNB) which amplifies, filters and shifts the incoming signal to an intermediate frequency band, such as L-band (between about 1.0 GHz and 2.0 GHz). The representative system, in particular, shifts the satellite signal to the frequency band between about 950 MHz and about 1450 MHz.<br><br>Williams '873 at 2:26–44:<br><br>Typically, only the RHCP transponder signals or the LHCP transponder signals are mixed down to L-band, depending on which particular A-V channel a user is viewing. However, in systems having a two-channel LNB, both the RHCP and the LHCP transponder signals may be individually shifted down to a 500 MHz portion of L-band (e.g., between 950 MHz and 1450 MHz) and provided, via separate lines, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. At the IRD, an A-V program associated with a particular channel within one of the program-multiplexed transponder signals is decoded and provided to a television or other presentation or processing device for display and/or for processing of transmitted data, audio output, etc. However, because cable lines are inherently frequency limited, typical cables used at receiver sites (such as RG-6 and RG-59) are not capable of simultaneously transmitting all of the received satellite signals (1000 MHz) along with standard CATV signals to the IRD.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V |

| Asserted Claims | Williams '873 |
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| | channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 8:20–35:<br><br>The third left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals at a frequency band between approximately 222 MHz and 414 MHz between the CATV or other signals at the VHF and UHF bands. In this case, the transmodulator 20 may need to select which terrestrial (e.g., CATV) signals should be placed in the available portions of the UHF band above about 450 MHz and in the available portions of the VHF band below about 200 MHz and may need to shift some or all of the chosen terrestrial signals to those bands before placing the transmodulated signals on the cable network 26. This frequency distribution technique is useful in lower quality cable systems that propagate signals at frequencies up to about 550 or perhaps 750 MHz without significant degradation.<br><br>Williams '873 at 9:40–48: |

| Asserted Claims | Williams '873 |
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| | The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:10–23:<br><br>The DVB cable encoder 60, which may comprise any known DVB encoder module, modulates the received stream of 188 byte DVB data packets using, preferably, a 128-QAM modulation technique, to produce a 6 MHz-wide transmodulated signal including all of the audio-visual programs associated with one of the 32 original transponder signals. The 6 MHz-wide transmodulated signal developed by the cable encoder 60 is provided to an upconverter 62 which shifts the 6-MHz wide transmodulated signal to an intermediate frequency (IF), preferably comprising one of four different carrier IFs used by the transmodulator 20. The upconverter 62 then provides the IF signal to one of a number of summers 64 associated with the transmodulator 20.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 10:40–52:<br><br>The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g., local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:36–67: |

| Asserted Claims | Williams '873 |
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| | The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the |

| Asserted Claims | Williams '873 |
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| | satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners. |

| Asserted Claims | Williams '873 |
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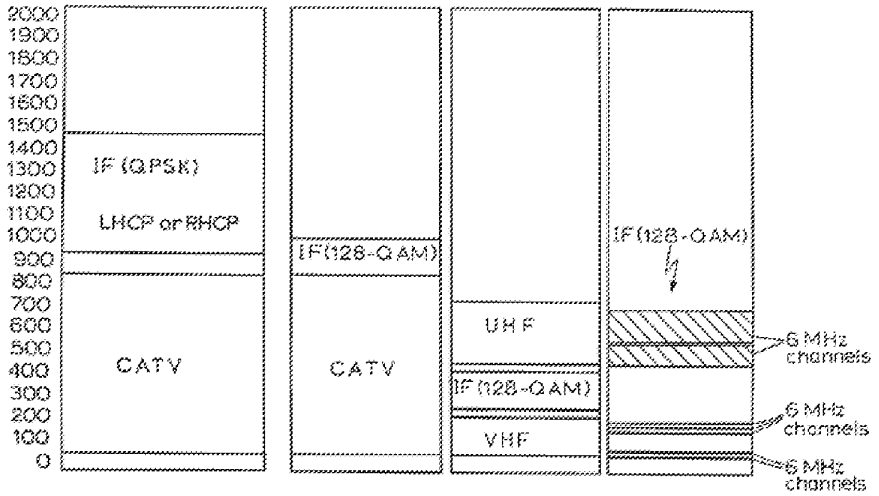
| | Williams '873 at Fig. 2:<br>  <br><br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[d] a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal; | Williams '873 discloses, explicitly and/or inherently, a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '873 |
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| | Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a |

| Asserted Claims | Williams '873 |
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| | portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 5:30–44:<br><br>By the way of example only, the signal distribution system of the present invention is described herein as redistributing a broadband Ku-band satellite signal (comprising up to 32, QPSK-modulated transponder signals transmitted from one or more satellites at a carrier frequency band centered around approximately 12.45 GHz) to receiver units within an MDU. It is understood however, that the signal distribution system of the present invention can be used to redistribute any other type of satellite or land-based wireless signal. The term program multiplex (PM) signal is used herein to describe any single or multiplex of purely visual (such as video), purely audio, or purely data signals as well as a signal comprising any combination of audio, visual, data or other signals including, for example, television signals, digital data signals, etc.<br><br>Williams '873 at 7:48–8:8:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a 1450 MHz capable cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or |

| Asserted Claims | Williams '873 |
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| | receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '873 at 8:9–19:<br><br>The three right-most columns of FIG. 2 illustrate methods of combining selected ones of the 32, 6 MHz-wide, 128-QAM-modulated signals with existing terrestrial signals on the cable network 26. The second left-most column of FIG. 2 illustrates a configuration in which the transmodulator 20 places one or more of the 32, 6 MHz-wide, 128-QAM-modulated signals within a band between about 804 MHz and 996 MHz directly above the common CATV channels. This configuration can be used with higher grade cable networks that propagate signals at up to 1000 MHz without significant degradation.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1. |

| Asserted Claims | Williams '873 |
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| | To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 9[e] wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs. | Williams '873 discloses, explicitly and/or inherently, wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs.<br><br>*See, e.g.*:<br><br>Williams '873 at Abstract:<br><br>A system for redistributing a broadband audio-visual-data signal to a multiplicity of receiver units within a multiple dwelling unit (MDU) includes a main receiving antenna that receives a broadband video/audio/data signal having a number of individual program multiplex signals therein and a transmodulator device that transmodulates a selected subset of the individual program multiplex signals associated with the broadband signal from a first modulation scheme to a second modulation scheme. The transmodulated signals are broadcast over a cable network, along with terrestrial signals, to individual receiver units at the MDU. The receiver units send requests for user-selected ones of the individual program multiplex signals to the transmodulator device, demodulate the transmodulated and/or terrestrial signals and provide user-specified channels to television sets for display.<br><br>Williams '873 at 1:13–18:<br><br>The present invention relates generally to signal distribution systems and, more particularly, to audio/visual/data signal distribution systems that distribute satellite signals |

| Asserted Claims | Williams '873 |
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| | typically in conjunction with standard terrestrial and/or cable signals to a plurality of individual receivers within one or more multiple dwelling units.<br><br>Williams '873 at 3:50–4:3:<br><br>The present invention relates to a low cost system and method for distributing a set of program multiplexed A-V signals and, possibly, existing terrestrial signals, to a multiplicity of receiver units within one or more MDUs using an MDU cable network or other transmission channel. According to one aspect of the present invention, a receiving antenna receives a broadband signal from, for example, a satellite or a land-based transmitter. A transmodulator transmodulates selected portions of the broadband signal into a transmodulated signal having a bandwidth that is smaller than that of the received broadband signal and transmits this transmodulated signal, typically along with standard terrestrial signals, over a communication channel, such as a cable or a wireless network, to a number of individual receiver units within an MDU. The receiver units demodulate the received transmodulated signal and provide user-specified channels to processing or display units, e.g., video displays, television sets, audio systems, computers, etc. The receiver units also send requests for user-selected channels to the transmodulator which uses these requests to select Which of the portions of the broadband signal will be transmodulated.<br><br>Williams '873 at 4:4–15:<br><br>According to another aspect of the present invention, a signal distribution system adapted to receive a composite signal having a multiplicity of transponder signals therein includes a transmodulator that transmodulates a selected one of the transponder signals from a first modulation scheme to a second modulation scheme to produce a transmodulated signal and a transmitter that transmits the transmodulated signal over a communication channel to a plurality of individual receivers. A receiver receives a request signal from each of the plurality of individual receivers and a controller selects the selected transponder signal in response to the request signals. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 4:39–44:<br><br>Moreover, the signal distribution system generates an information signal, known as side data, which may include channel set-up information, frequency index set-up information, etc. This information signal is used by the receiver to select a requested signal from the plurality of individual program multiplex signals.<br><br>Williams '873 at 4:45–59:<br><br>The signal distribution system may include a second receiver adapted to receive a terrestrial signal while the combiner may combine the multiplicity of transmodulated signals with the terrestrial signal to produce the combined signal. Furthermore, a reception device coupled to the communication channel at one of the individual receivers may include a receiver that receives the combined signal, a demodulator that demodulates a |

| Asserted Claims | Williams '873 |
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| | portion of the received combined signal and an individual transmitter that transmits one of the request signals to the transmodulator indicating one of the plurality of program multiplex signals to be transmodulated. If desired, the transmodulator channels may transmodulate between a quadrature phase shift keying (QPSK) modulation scheme and a quadrature amplitude modulation (QAM) scheme, such as a 128-QAM scheme.<br><br>Williams '873 at 4:60–5:5:<br><br>According to a still further aspect of the present invention, a method of distributing a subset of a plurality of individual signals associated with a composite signal to multiple individual receivers includes the steps of receiving the composite signal, receiving a request signal from each of the individual receivers and choosing the subset of the plurality of the individual signals to be distributed based on the received request signals. Each of the subset of the plurality of the individual signals is transmodulated from a first modulation scheme to a second modulation scheme and is transmitted over a communication channel to the individual receivers.<br><br>Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a |

| Asserted Claims | Williams '873 |
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| | transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 9:28–39:<br><br>In accordance with the present invention, the number of transmodulator channels is less than the number of transponder signals associated with the received satellite or other signal and, in a preferred embodiment, the transmodulator 20 includes up to, but less than, 32 transmodulator channels, each of which includes a switch 53, a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 received transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the transmodulator channels will be described herein.<br><br>Williams '873 at 10:40–52: |

| Asserted Claims | Williams '873 |
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| | The level shifter 70 may receive signals from an off-air antenna, from a cable provider and/or from any other desired signal source (e.g., local security or data services) and pass these signals through to the summer 68 at their current carrier frequency, or may shift these signals to one or more different carrier frequencies for propagation over the cable network 26 using any standard frequency translation or mixer circuitry. Of course, if desired, the level shifter 70 may include circuitry similar to the above-described transmodulator channels and transmodulate one or more of the received terrestrial signals to any desired modulation scheme, such as a 128-QAM scheme, for transmission over the cable network 26.<br><br>Williams '873 at 14:65–15:14:<br><br>Furthermore, as noted above, modulation techniques besides QAM can be used when transmodulating the decoded satellite signal. Other such modulation techniques may include, for example, any high rate digital modulation techniques such as VSB (vestigial side band), including 8-VSB, 16-VSB etc., or QAM with trellis-coded modulation. Other modulation techniques which may be developed in the future could similarly be used without departing from the spirit and scope of the present invention. In general, the choice of a modulation technique will be driven by the reduction in bandwidth which must be accomplished by the modulation technique and by the noise susceptibility of the modulation technique. If a different modulation technique is used, however, it is understood that a different type of cable encoder will be necessary to properly transmodulate the desired transponder signals (or other received signals) for propagation over the cable network 26.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that |

| Asserted Claims | Williams '873 |
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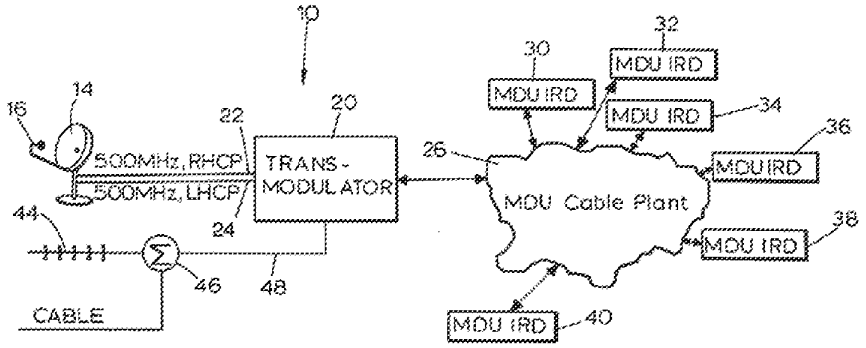
| | it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at Fig. 1:<br><br>  <br><br><br>FIG. 1<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 10. The signal distribution system of claim 9 wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. | Williams '873 discloses, explicitly and/or inherently, wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output. |

| Asserted Claims | Williams '873 |
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| | *See* claim 9, *supra*.<br><br>*See, e.g.*:<br><br>Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the |

| Asserted Claims | Williams '873 |
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| | individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate.<br><br>Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to |

| Asserted Claims | Williams '873 |
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| | a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 6:35–46:<br><br>In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 |

| Asserted Claims | Williams '873 |
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| | may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the |

| Asserted Claims | Williams '873 |
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| | transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 7:48–8:8:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a 1450 MHz capable cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 9:28–39:<br><br>In accordance with the present invention, the number of transmodulator channels is less than the number of transponder signals associated with the received satellite or other signal and, in a preferred embodiment, the transmodulator 20 includes up to, but less than, 32 transmodulator channels, each of which includes a switch 53, a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 received transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the transmodulator channels will be described herein.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:36–67: |

| Asserted Claims | Williams '873 |
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| | The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:1–6:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>Williams '873 at 12:7–16: |

| Asserted Claims | Williams '873 |
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| | The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the transmodulated signals and, if so, identify that band for use by a specific one or more of the transmodulated signals by changing the output frequency of, for example, the upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all of the transmodulated signals.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 12:35–47:<br><br>A transmodulator control panel 74 is coupled to the control unit 72 and, preferably, includes signal strength measurement devices that indicate the relative strength of each of the satellite signals and/or each of the terrestrial signals input to the transmodulator 20. The control panel 74 may also allow an operator to choose default frequency locations for each of the transmodulated and/or terrestrial signals and may include controls that permit an installer to select the carrier frequency bands for any number of the transmodulated and/or |

| Asserted Claims | Williams '873 |
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| | terrestrial signals. Of course, the transmodulator control panel 74 and the control unit 72 may perform any other desired functions with respect to the transmodulator 20.<br><br>Williams '873 at 15:15–27:<br><br>Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 15:53–16:4:<br><br>The IRD 30 may initially scan all the channels from, for example, low carrier frequencies to high carrier frequencies, to locate the frequency bands or channels used by the selected ones of the transmodulated signals and then assign channel numbers to these located signals based on a predetermined ordering scheme used by the transmodulator 20. However, as noted above, the transmodulator 20 may actively signal the channel locations, ordering, frequency assignments, etc. of the transmodulated satellite signals and/or terrestrial signals via a communication channel (using side data) established over, for example, the cable network 26. Such a communication channel may comprise a low-speed channel that uses uncoded bits of the sync and error code bytes within the, for example, 188 byte data packets, and may be used to deliver any desired information to the IRD 30 over time, i.e., using a large number of the 188 byte data packets.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and |

| Asserted Claims | Williams '873 |
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| | transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at 16:22--42:<br><br>The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '873 at Fig. 2: |

| Asserted Claims | Williams '873 |
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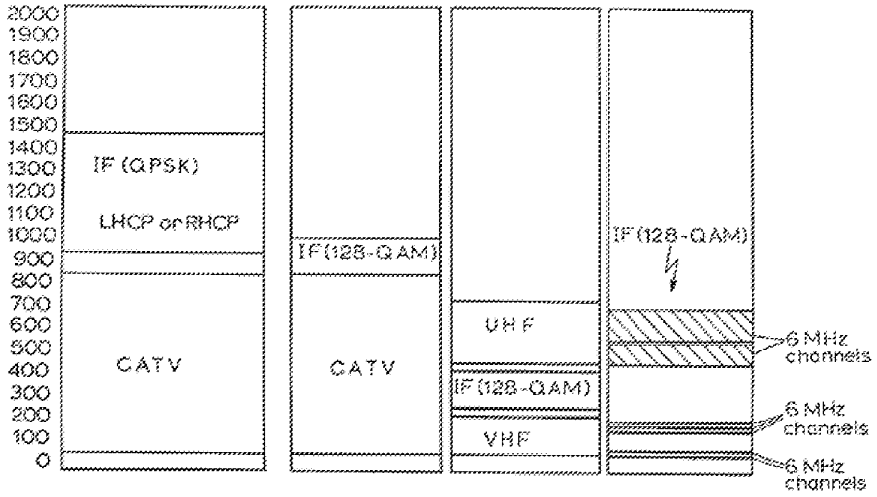
| |  <br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 11. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network. | Williams '873 discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the |

| Asserted Claims | Williams '873 |
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| | transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 6:35–46:<br><br>In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable |

| Asserted Claims | Williams '873 |
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| | network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other |

| Asserted Claims | Williams '873 |
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| | communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 7:48–8:8:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a 1450 MHz capable cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '873 at 9:28–39:<br><br>In accordance with the present invention, the number of transmodulator channels is less than the number of transponder signals associated with the received satellite or other signal |

| Asserted Claims | Williams '873 |
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| | and, in a preferred embodiment, the transmodulator 20 includes up to, but less than, 32 transmodulator channels, each of which includes a switch 53, a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 received transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the transmodulator channels will be described herein.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches |

| Asserted Claims | Williams '873 |
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| | 53, tuners 54, the satellite decoders 56, the packetizers 58, the cable encoders 60, the upconverters 62, the variable frequency upconverter 66 and the level shifter 70 in any desired manner. To implement such control, however, the control unit 72 receives satellite signal requests from the IRDs 30-40 which are received, demodulated and decoded by a demodulator/decoder 73. These satellite signal requests may be transmitted from the IRDs 30-40 over the cable network 26 at, for example, a dedicated frequency, over some other wire network or via any desired wireless network. The satellite signal requests may be digital or analog requests using any desired or known communication format, such as MCNS. These requests may be sent from the IRDs 30-40 periodically to indicate to the control unit 72 which satellite transponder signals are being actively requested by the IRDs 30-40 or these requests may be sent when an IRD initially tries to tune to one of the satellite transponder signals.<br><br>Williams '873 at 11:6–21:<br><br>Generally, the control unit 72 assimilates all of the satellite signal requests received from the IRDs 30-40, determines which of the satellite signals or transponder signals must be decoded to satisfy these requests and controls a different one of the transmodulator channels to transmodulate each of the so-determined transponder signals for transmission over the cable network 26. The control unit 72 may cause the selected transponder signals to be transmodulated by controlling the tuners 54 of different ones of the transmodulator channels to tune to a specific one of the selected transponder signals. The control unit 72 may assign the transmodulator channels to tune to different transponder signals on a first come, first serve basis, by determining which of the transponder signals have the highest number of active requests associated therewith or using any other desired technique.<br><br>Williams '873 at 11:36–67:<br><br>The control unit 72 may control the frequencies used by the upconverters 62 and 66 and/or the level shifter 70 to control the carrier frequencies at which the transmodulated signals, as well as the terrestrial signals, are transmitted over the cable network 26. In a preferred embodiment, the transmodulator control unit 72 automatically determines which |

| Asserted Claims | Williams '873 |
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| | frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:1–6:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>Williams '873 at 12:7–16:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the transmodulated signals and, if so, identify that band for use by a specific one or more of the transmodulated signals by changing the output frequency of, for example, the |

| Asserted Claims | Williams '873 |
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| | upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all of the transmodulated signals.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 12:35–47:<br><br>A transmodulator control panel 74 is coupled to the control unit 72 and, preferably, includes signal strength measurement devices that indicate the relative strength of each of the satellite signals and/or each of the terrestrial signals input to the transmodulator 20. The control panel 74 may also allow an operator to choose default frequency locations for each of the transmodulated and/or terrestrial signals and may include controls that permit an installer to select the carrier frequency bands for any number of the transmodulated and/or terrestrial signals. Of course, the transmodulator control panel 74 and the control unit 72 may perform any other desired functions with respect to the transmodulator 20.<br><br>Williams '873 at 15:15–27: |

| Asserted Claims | Williams '873 |
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| | Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 15:53–16:4:<br><br>The IRD 30 may initially scan all the channels from, for example, low carrier frequencies to high carrier frequencies, to locate the frequency bands or channels used by the selected ones of the transmodulated signals and then assign channel numbers to these located signals based on a predetermined ordering scheme used by the transmodulator 20. However, as noted above, the transmodulator 20 may actively signal the channel locations, ordering, frequency assignments, etc. of the transmodulated satellite signals and/or terrestrial signals via a communication channel (using side data) established over, for example, the cable network 26. Such a communication channel may comprise a low-speed channel that uses uncoded bits of the sync and error code bytes within the, for example, 188 byte data packets, and may be used to deliver any desired information to the IRD 30 over time, i.e., using a large number of the 188 byte data packets.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable |

| Asserted Claims | Williams '873 |
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| | network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at 16:22–42:<br><br>The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '873 at Fig. 2: |

| Asserted Claims | Williams '873 |
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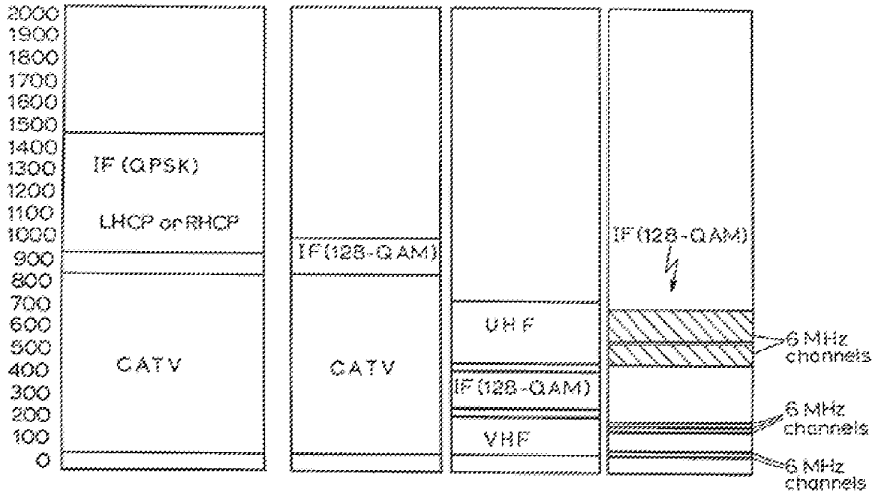
| |  <br>FIG. 2<br><br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |
| 12. The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network. | Williams '873 discloses, explicitly and/or inherently, wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network.<br><br>*See* claim 10, *supra*.<br><br>*See, e.g.*: |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 1:64–2:14:<br><br>Satellite signal distribution systems exist for many frequency bands, including the so-called "Ku-band." One known Ku-band direct-to-home satellite system now in-operation uses an uplink signal having 16 RHCP transponder signals and 16 LHCP transponder signals modulated onto frequency bands between about 17.2 GHz, and about 17.7 GHz. Each of these 32 transponder signals is program-multiplexed to include digital data packets associated with e.g. about five to eight or more individual A-V programs, such as television channels, and is modulated according to a quaternary phase shift keying (QPSK) modulation scheme. The satellites associated with this system shift the uplink transponder signals to carrier frequencies ranging from approximately 12.2 GHz to approximately 12.7 GHz and transmit these frequency-shifted transponder signals back to earth for reception at each of a plurality of individual receiver units.<br><br>Williams '873 at 4:16–38:<br><br>According to another aspect of the present invention, a signal distribution system for distributing a composite signal having a plurality of individual program multiplex signals therein over a communication channel to a number of individual receivers includes a main receiver that receives the composite signal and a multiplicity of transmodulator channels coupled to the main receiver. Each of the multiplicity of transmodulator channels, preferably numbering less than the number of individual program multiplex signals, transmodulates a different one of the plurality of individual program multiplex signals from a first modulation scheme to a second modulation scheme to produce one of a multiplicity of transmodulated signals. A combiner combines the multiplicity of transmodulated signals at different carrier frequency bands to produce a combined signal and a transmitter transmits the combined signal over the communication channel to the individual receivers. The signal distribution system also includes a request receiver that receives a request signal from each of the individual receivers and a controller coupled to the request receiver that controls which of the plurality of individual program multiplex signals each of the multiplicity of transmodulator channels is to transmodulate. |

| Asserted Claims | Williams '873 |
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| | Williams '873 at 5:59–6:11:<br><br>The signal distribution system 10 includes a main signal receiver 14 disposed on, for example, the roof of an MDU or any other location capable of receiving a signal transmitted by a satellite or other signal source. The signal receiver 14 is preferably in the form of a 24-inch diameter parabolic dish antenna pointed towards, for example, satellites that transmit a Ku-band or other broadband, QPSK-modulated PM composite signal. A two-channel LNB 16 associated with the dish antenna 14 receives the modulated satellite signal reflected from the dish antenna 14. Each of the channels of the LNB 16 filters either the RHCP or the LHCP component of the received signal and mixes this filtered signal down to an intermediate frequency band, for example, the portion of L-band between 950 MHz and 1450 MHz. The LNB 16 amplifies and provides the 500 MHz, L-band signals associated with each of the RHCP and LHCP components of the downlink signal to a transmodulator 20 via lines 22 and 24, respectively. Other methods for providing the received QPSK input signals to the transmodulator 20 may also be used.<br><br>Williams '873 at 6:12–34:<br><br>The transmodulator 20 remodulates or transmodulates a subset of the signals received from the LNB 16 using an output modulation technique that, preferably, reduces the bandwidth of the signals received from the LNB 16 from two 500 MHz bands (i.e., a total of 1000 MHz) to any lower bandwidth. This reduction in bandwidth may be accomplished by utilizing a more aggressive encoding scheme with appropriate error detection and correction codes and/or by remodulating less than all of the received transponder signals associated with the composite signal. The transmodulator 20 then places the transmodulated, reduced-in-bandwidth signal having less than all of the received transponder signals on a cable plant or cable network 26 within an MDU for distribution to a number of IRDs 30, 32, 34, 36, 38 and 40 associated with individual receiver units spread throughout the MDU. The transmodulator 20 may instead, or in addition, distribute the transmodulated signals over wire or via any wireless communication channel (including, for example, microwave and optical systems) to head-ends at any other MDUs or local sites or portions thereof. Of course, the transmodulator 20 may also distribute the |

| Asserted Claims | Williams '873 |
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| | transmodulated signals directly to IRDs using any desired wireless communication channel.<br><br>Williams '873 at 6:35–46:<br><br>In order to determine which of the received satellite transponder signals should be transmodulated at any particular time, the transmodulator 20 receives and decodes requests for particular channels or satellite signals from each of the IRDs 30-40 that are active, determines from these requests which of the set of satellite or transponder signals to transmodulate and then tunes to and transmodulates only those selected satellite or transponder signals. The transmodulator sends the updated frequency index to the receiver via side data. If no transponders are available to fulfill the request, the transmodulator sends an error message to the receiver indicating that no transponder is available.<br><br>Williams '873 at 6:47–7:3:<br><br>The transmodulator 20 may also receive signals from a cable provider, a local off-air antenna 44, and/or any other desired signal source such as those that locally generate A-V channels (e.g., security camera channels, data networks, or informational channels) using any standard receiving mechanism such as an antenna, modem or cable connection, and places these signals on the cable network 26 for distribution to the IRDs 30-40. These other signals, referred to hereinafter as terrestrial signals, may comprise any cable, satellite or off-air signal including, for example, standard CATV, UHF, VHF, FM radio signals and/or locally generated signals such as security camera or bulletin board channels. The terrestrial signals may be summed or added together in a summing network 46 (which may comprise any standard signal summer) and provided to the transmodulator 20 via a cable line 48, or may be provided separately to the transmodulator 20. The transmodulator 20 may pass the received terrestrial signals to the cable network 26 at the carrier frequencies at which the terrestrial signals are received, or the transmodulator 20 may shift some or all of the terrestrial signals in frequency to use the available frequency spectra of the cable |

| Asserted Claims | Williams '873 |
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| | network 26 more efficiently. Where input terrestrial signals are provided in base-band, suitable RF modulators may be used.<br><br>Williams '873 at 7:4–23:<br><br>Preferably, the transmodulator 20 transmodulates selected signals within the two 500 MHz-wide QPSK-modulated downlink signals into 128-QAM-modulated signals, wherein each such transmodulated signal is 6 MHz-wide. The transmodulator 20 may then place each of the transmodulated 6 MHz-wide, 128-QAM-modulated signals on the cable network 26 at any unused or desired carrier frequency bands while, simultaneously, sending the terrestrial signals over the cable network 26 at any other desired carrier frequency bands. Alternatively, the transmodulator 20 may use any other desired modulation technique to remodulate selected ones of the received satellite signals. In fact, in some cases in which only a few of the selected signals are being distributed, the transmodulator may not need to remodulate the selected signals but may, instead, send these signals over the cable network 26 at the received modulation scheme. As noted above, the transmodulator 20 may provide the transmodulated signals and/or the terrestrial signals to the IRDs 30-40 over any wireless network, if so desired.<br><br>Williams '873 at 7:24–47:<br><br>Each of the IRDs 30-40 receives the selected ones of the QAM-modulated, 6 MHz-wide signals along with the terrestrial signals from the cable network 26 (or wireless channel) and demodulates a user-selected one of these signals. Each of the IRDs 30-40 then provides the demodulated user-selected signal(s) to an output device or processor, such as a television set (not shown), for display or processing thereby. When a user at one of the IRDs 30-40 requests to receive a particular satellite signal or transmodulator signal, the IRD first checks the current channel assignments to see if the requested signal is available. If so, the IRD demodulates the requested signal and, if not, the IRD sends a request to the transmodulator 20 to tune to, transmodulate and transmit the requested signal over the cable network 26. This request may be sent via the cable network 26, via a different wire network provided in the MDU, via any desired wireless network or via any other |

| Asserted Claims | Williams '873 |
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| | communication channel. If desired, the request signal may be sent to the transmodulator using the well known Multi-Media Cable Network System (MCNS) protocol, which provides communication over the same cable as the video signals. The MCNS protocol typically utilizes the range from 5 to 42 MHz and enables multiple receivers to communicate to the same transmodulator.<br><br>Williams '873 at 7:48–8:8:<br><br>Referring now to FIG. 2, representative methods of combining the transmodulated transponder signals along with terrestrial signals on the cable network 26 are illustrated. The left-most column of FIG. 2 illustrates a previously known method of placing QPSK-modulated signals along with terrestrial signals on a cable network. According to this scheme, all existing terrestrial signals (including cable TV signals) are distributed at, for example, VHF and UHF carrier frequencies below 950 MHz while one of the 500 MHz-wide QPSK-modulated signals (associated with either the LHCP or the RHCP component of the satellite signal) is placed directly on the cable network at the unused band between about 950 MHz and 1450 MHz. A major problem with this configuration is that only the RHCP or the LHCP transponder signals can be placed on a 1450 MHz capable cable network at any given time which, in turn, prevents IRDs within an MDU from decoding or receiving channels associated with the other of the LHCP or the RHCP transponder signals. While this problem can be overcome by running two cable lines throughout an MDU or by utilizing a high frequency cable plant capable of approximately 2 GHz or greater bandwidth, these solutions require additional equipment and expense and are not adaptable to most existing cable plants now in use. Furthermore, the signals provided at the 950 MHz to 1450 MHz band can be severely degraded by the cable plant due to the poor high frequency propagation properties of many existing cable plants, especially older cable plants.<br><br>Williams '873 at 9:28–39:<br><br>In accordance with the present invention, the number of transmodulator channels is less than the number of transponder signals associated with the received satellite or other signal |

| Asserted Claims | Williams '873 |
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| | and, in a preferred embodiment, the transmodulator 20 includes up to, but less than, 32 transmodulator channels, each of which includes a switch 53, a tuner 54, a satellite decoder 56, a packetizer 58, a cable encoder 60, and an upconverter 62. Each transmodulator channel decodes and transmodulates one of the 32 received transponder signals associated with the downlink signal in essentially the same manner and, as a result, the operation of only one of the transmodulator channels will be described herein.<br><br>Williams '873 at 9:40–48:<br><br>The tuner 54 of a transmodulator channel tunes to one of the transponder signals associated with either the RHCP or the LHCP signal within the L-band range between 950 and 1450 MHz provided through the switch 53, while filtering out the other 15 transponder signals within that band, to produce a 24 MHz-wide, QPSK-modulated signal corresponding to a selected one of the 32 satellite transponder signals. If desired, the tuner 54 may shift the tuned 24 MHz-wide, QPSK-modulated signal down to baseband.<br><br>Williams '873 at 10:24–39:<br><br>In the configuration of FIG. 3, each of the summers 64 receives an input from, for example, four of the upconverters 62, each of which upconverts to a different one of the four carrier IFs. Each of the summers 64 combines the four received transmodulated signals to produce, for example, one of up to eight groups of four, 6 MHz-wide transmodulated signals. The summers 64 of FIG. 3 provide up to eight such groups of four, 6 MHz-wide signals to a variable frequency upconverter 66 which, in turn, upconverts each of the up to eight groups of four, 6 MHz-wide signals to a different carrier frequency band. A summer 68 then combines these upconverted transmodulated signals with each other and with any desired frequency-shifted or non-frequency-shifted terrestrial signals (delivered by a level shifter 70) for propagation over the cable network 26 of FIG. 1.<br><br>Williams '873 at 10:53–11:5:<br><br>A transmodulator control unit 72, which may be implemented in the form of a microprocessor or any other digital or analog controller, preferably controls the switches |

| Asserted Claims | Williams '873 |
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| Asserted Claims | Williams '873 |
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| | frequencies to use as carrier frequencies for the selected ones of the 32, 6 MHz-wide transmodulated signals (or other transmodulated signals) developed by each of the transmodulator channels. In this preferred configuration, the transmodulator control unit 72 may include a signal detector (not shown) attached to the line 48 upon which the terrestrial signals are received. At start up or at any other desired time, the signal detector scrolls through or scans the frequency bands between about 54 MHz and 806 MHz (and higher bands if desired) and checks the power lever and/or tries to tune to standard channel locations to determine which channel locations are being used for terrestrial signals. Typically standard terrestrial channel locations are spaced 6 MHz apart. If the signal detector detects enough power and/or is able to tune to a standard channel, e.g., if it tunes to a carrier signal and gets a video sync code, the control unit 72 identifies that the band associated with that channel is being used by a terrestrial (e.g., CATV) signal. However, if the signal detector does not detect sufficient power and/or is unable to tune to any particular channel, the band associated with that channel is identified as an empty band and, therefore, as potentially available for use with one or more of the transmodulated signals. The control unit 72 may, instead, include any standard channel or frequency sniffer which locates the frequency bands used by the received terrestrial signals in any other desired manner.<br><br>Williams '873 at 12:1–6:<br><br>After the control unit 72 identifies all of the empty or unused frequency bands, this information is preferably stored in non-volatile memory. Operator selection (e.g., by means of a keypad) may also be utilized to select or de-select frequency bands, either alone or in conjunction with an automated system.<br><br>Williams '873 at 12:7–16:<br><br>The control unit 72 may then, in one embodiment, start at the lowest unoccupied band, determine if this band is wide enough to carry one or more, i.e., any desired number, of the transmodulated signals and, if so, identify that band for use by a specific one or more of the transmodulated signals by changing the output frequency of, for example, the |

| Asserted Claims | Williams '873 |
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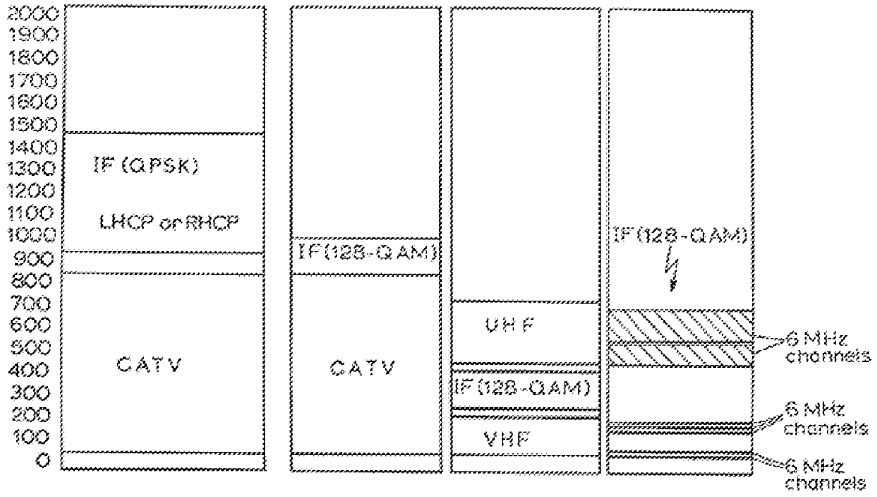
| | upconverter 66 associated with those transmodulated signals. The control unit 72 may go as high as necessary in frequency to assign carrier frequencies to all of the transmodulated signals.<br><br>Williams '873 at 12:17–34:<br><br>If the terrestrial signals are spread out throughout the available cable spectra in a manner which makes it impossible or difficult to find empty bands of sufficient predetermined width for all of the desired transmodulated signals, the control unit 72 and/or operator input may identify one or more of the terrestrial signals and/or the satellite channels to be eliminated (not provided over the system) or shifted in frequency to thereby produce sufficient regions of continuous spectrum for use by any desired subsets or groupings of the transmodulated signals. In the case in which one or more of the terrestrial signals or the satellite signals are eliminated, the control unit 72 preferably selects the one or more signals for elimination based on a predetermined priority criterion which may be, for example, input by a user or stored in a memory associated with the control unit 72. The priority criterion may prioritize the satellite or terrestrial signals for elimination based on the channel or frequency at which these signals arrive at the transmodulator 20 or based on any other desired criteria.<br><br>Williams '873 at 12:35–47:<br><br>A transmodulator control panel 74 is coupled to the control unit 72 and, preferably, includes signal strength measurement devices that indicate the relative strength of each of the satellite signals and/or each of the terrestrial signals input to the transmodulator 20. The control panel 74 may also allow an operator to choose default frequency locations for each of the transmodulated and/or terrestrial signals and may include controls that permit an installer to select the carrier frequency bands for any number of the transmodulated and/or terrestrial signals. Of course, the transmodulator control panel 74 and the control unit 72 may perform any other desired functions with respect to the transmodulator 20.<br><br>Williams '873 at 15:15–27: |

| Asserted Claims | Williams '873 |
|---|---|
| | Still further, the transmodulator 20 need not remodulate the received transponder signals but may, instead, shift selected ones of these signals to different frequencies for transmission over the cable network 26. In this case, each transmodulator channel would need to include a tuner and a frequency shifter. Of course, this configuration only reduces the bandwidth used by the signals transmitted over the cable network 26 to the extent that it eliminates some of the received satellite transponder signals. Thus, the more received satellite transponder signals that are to be sent to the IRDs 30-40, i.e., the more transmodulator channels there are, the less viable this option becomes.<br><br>Williams '873 at 15:53–16:4:<br><br>The IRD 30 may initially scan all the channels from, for example, low carrier frequencies to high carrier frequencies, to locate the frequency bands or channels used by the selected ones of the transmodulated signals and then assign channel numbers to these located signals based on a predetermined ordering scheme used by the transmodulator 20. However, as noted above, the transmodulator 20 may actively signal the channel locations, ordering, frequency assignments, etc. of the transmodulated satellite signals and/or terrestrial signals via a communication channel (using side data) established over, for example, the cable network 26. Such a communication channel may comprise a low-speed channel that uses uncoded bits of the sync and error code bytes within the, for example, 188 byte data packets, and may be used to deliver any desired information to the IRD 30 over time, i.e., using a large number of the 188 byte data packets.<br><br>Williams '873 at 16:5–21:<br><br>The IRD 30 includes a controller 105 that receives satellite signal requests from a user and then sends requests to the transmodulator 20 via, for example, an MCNS interface 107 and the cable network 26, to have the requested transponder signals transmodulated and transmitted to the IRD 30 via the cable network 26. The controller 105 also receives and decodes information from the transmodulator 20 indicating the carrier frequencies, etc. of the transmodulated signals that are on the cable network 26. When the controller 105 recognizes that a user-requested channel is being transmodulated and sent via the cable |

| Asserted Claims | Williams '873 |
|---|---|
| | network 26, the controller 105 controls a tuner 110, connected to the cable network 26, to tune to the frequency band associated with the requested signal. If necessary, the tuner 110 may include a down-converter which shifts higher frequency 6 MHz channels to lower frequencies commonly supported by standard tuners.<br><br>Williams '873 at 16:22–42:<br><br>The tuned signal is provided to a decoder 112, which may comprise a standard DVB cable decoder such as the BCM3118 decoder chip manufactured by Broadcom Corp. Generally, the decoder 112 includes a 128-QAM demodulator that demodulates the QAM transmodulated signal to produce a set of interleaved, R-S encoded data packets. A de-interleaver de-interleaves the data packets and, thereafter, an R-S decoder strips off the error coding and, to the extent possible, corrects errors resulting from transmission over the cable, to produce a stream of 188 byte data packets. Thereafter a descrambler descrambles each of the 188-byte data packets to remove the effects of the scrambler 90 of FIG. 6. The DVB cable decoder 112 delivers the stream of 188 byte data packets, each having 187 bytes of data and one sync byte, to a packetizer 114 while, simultaneously, providing an indication of whether the data associated with each of the 188 byte data packets has experienced a non-recoverable error during transmission over the cable network 26. This indication may be developed by the R-S decoder of the DVB decoder 112 and provided to the packetizer 114 via, for example, a line 115.<br><br>Williams '873 at Fig. 2: |

| Asserted Claims | Williams '873 |
|---|---|
| |  <br>FIG. 2<br>To the extent Williams '873 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Williams '873 alone or it would have been obvious to combine Williams '873 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix B thereto. |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 47046569 |
| **Application Number:** | 17956889 |
| **International Application Number:** | |
| **Confirmation Number:** | 8470 |
| **Title of Invention:** | SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL |
| **First Named Inventor/Applicant Name:** | Madhukar Reddy |
| **Customer Number:** | 23446 |
| **Filer:** | Wayne Bradley/Laura Foley |
| **Filer Authorized By:** | Wayne Bradley |
| **Attorney Docket Number:** | 28427US16 |
| **Receipt Date:** | 17-NOV-2022 |
| **Filing Date:** | 30-SEP-2022 |
| **Time Stamp:** | 15:37:48 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

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|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Information Disclosure Statement (IDS) Form (SB08) | 28427US16_IDS_sb08a_EFS-WEB.pdf | 1236533<br>f5340ee1508ac186b9e0334c9410b0424f5ba6d2 | no | 7 |

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| 2 | Non Patent Literature | NPL_2__part_1.pdf | 712303<br>3b1be53530c022c6687a6a907b642098d844a57d | no | 106 |
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| 3 | Non Patent Literature | NPL_2__part_2.pdf | 615928<br>dcc8cb9b433ab28848a0b000da4484036a6f8168 | no | 106 |
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| 5 | Non Patent Literature | NPL_2__part_4.pdf | 614642<br>835f12cc848fb50b93ba397e40bee57fbf3b1426 | no | 106 |
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| 6 | Non Patent Literature | NPL_2__part_5.pdf | 663128<br>ab92c13d63d6667643de5750ef5905db3bc666a9 | no | 106 |
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| 7 | Non Patent Literature | NPL_1a.pdf | 963921<br>c3620e3db59c57d86d3e4e03e0d4e6870ce0eba2 | no | 137 |
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| 8 | Non Patent Literature | NPL_3a.pdf | 1444792<br>402557568e23c859c7f50f8fd6109f6d6fcf5ecf | no | 139 |
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| 9 | Non Patent Literature | NPL_4a.pdf | 1266726<br>5f6fce21871230b4f92942719d671517804e7f97 | no | 108 |
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| 10 | Non Patent Literature | NPL_5a.pdf | 323158<br>a17d8ed00d867b0da078915f18dcbedf4bf16f03 | no | 16 |
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| 11 | Non Patent Literature | NPL_6a.pdf | 301063<br>0ef96fa55549b47a08f2eb67ca44274a178885da | no | 12 |
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| 12 | Non Patent Literature | NPL_7a.pdf | 422194<br>0a508bfba8b4a1721699929d911fc553fcff3bf1 | no | 17 |
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| 13 | Non Patent Literature | NPL_8a.pdf | 353464<br>c829b67604b027f467153711c46612b366ad4350 | no | 15 |
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| 14 | Non Patent Literature | NPL_9a.pdf | 445459<br>363f37071348c5ecd06fdf282ad2bbef34e87e47 | no | 19 |
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| 21 | Non Patent Literature | NPL_16a.pdf | 317594<br>95436d059e959d7f61d3fadbcb582ed9193f6227 | no | 46 |
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| 22 | Non Patent Literature | NPL_17a.pdf | 549370<br>a4c182be3a9dd19f562c1f235a0546da315be52a | no | 64 |
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| 29 | Non Patent Literature | NPL_24a.pdf | 832441<br>04258d720feb8999a4226d0bc5db7a4b9fdd37bc | no | 140 |
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| 33 | Non Patent Literature | NPL_28a.pdf | 471165<br>c3c77c23dd7e756d8aee191d46e4d81e20184dbc | no | 46 |
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| 40 | Non Patent Literature | NPL_35a.pdf | 409953<br>3d5b216cbd0befed0bb268e47a7f32cd6bf86849 | no | 35 |
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| 41 | Non Patent Literature | NPL_36a.pdf | 485623<br>1f6ab93df28e5b589878a34dfb0b6f3553b3cbb0 | no | 66 |
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| 42 | Non Patent Literature | NPL_37a.pdf | 560195<br>cc72921d1958bd3dec4762874ebf12164f6c0c4a | no | 77 |
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| 43 | Non Patent Literature | NPL_38__part_1.pdf | 846908<br>e250bd0401f9b98a49e4ea3dcdb197cb735abacd | no | 106 |
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| 44 | Non Patent Literature | NPL_38__part_2.pdf | 764043<br>8a4e50297b10011ec0df2befd8dadab5c7bd28eb | no | 106 |
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| 46 | Non Patent Literature | NPL_38__part_4.pdf | 756124<br>8c490eb9dfcf9d7c63b6c5b80f1da7b284dabb0c | no | 106 |
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| 47 | Non Patent Literature | NPL_38__part_5.pdf | 841327<br>dd3207460b4ed54424d9bf9adce48d7f90283f6e | no | 107 |
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|---|---|---|---|---|---|---|
| 17/956,889 | 09/30/2022 | | 1980 | 28427US16 | 18 | 2 |

**CONFIRMATION NO. 8470**

**UPDATED FILING RECEIPT**

23446
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500 WEST MADISON STREET
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CHICAGO, IL 60661

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Date Mailed: 11/21/2022

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**Inventor(s)**

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**Applicant(s)**

Entropic Communications, LLC, New York, NY;

**Power of Attorney:** The patent practitioners associated with Customer Number 23446

**Domestic Priority data as claimed by applicant**

This application is a CON of 17/862,946 07/12/2022 PAT 11,490,152
which is a CON of 17/587,462 01/28/2022 PAT 11,399,206
which is a CON of 17/217,244 03/30/2021 ABN
which is a CON of 16/430,506 06/04/2019 PAT 10,972,781
which is a CON of 15/792,318 10/24/2017 PAT 10,313,733
which is a CON of 14/948,881 11/23/2015 PAT 9,819,992
which is a CON of 14/617,973 02/10/2015 PAT 9,210,363
which is a CON of 13/962,871 08/08/2013 PAT 9,100,622
which is a CON of 12/762,900 04/19/2010 PAT 8,526,898
which claims benefit of 61/170,526 04/17/2009

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.

*Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.*

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**Projected Publication Date:** 03/02/2023

**Non-Publication Request:** No

**Early Publication Request:** No
**Title**

SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL

**Preliminary Class**

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

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---

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## PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/956,889

### APPLICATION AS FILED - PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY FEE($) |
|---|---|---|---|---|---|---|---|
| BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | | | N/A | 320 |
| SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | | | N/A | 700 |
| EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | | N/A | 800 |
| TOTAL CLAIMS (37 CFR 1.16(i)) | 18 minus 20 = | * 0 | | | OR | x = | 0 |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | 2 minus 3 = | * | | | | x = | 0 |
| APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | | | 0 |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | | | 0 |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | | TOTAL | 1820 |

### APPLICATION AS AMENDED - PART II

| | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY ADDITIONAL FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|---|
| AMENDMENT A | Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| | Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

| | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE($) | ADDITIONAL FEE($) | | RATE($) | ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|---|
| AMENDMENT B | Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| | Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

**IN THE UNITED STATES DISTRICT COURT**
**FOR THE EASTERN DISTRICT OF TEXAS**
**MARSHALL DIVISION**

| | |
|---|---|
| ENTROPIC COMMUNICATIONS, LLC;<br><br>Plaintiff,<br><br>v.<br><br>DIRECTV, LLC, and<br>AT&T SERVICES, INC.,<br><br>Defendants. | Civil Action No. 2:22-CV-00075-JRG<br><br>LEAD CASE<br><br>JURY TRIAL DEMANDED |
| ENTROPIC COMMUNICATIONS, LLC;<br><br>Plaintiff,<br><br>v.<br><br>DISH NETWORK CORPORATION;<br>DISH NETWORK L.L.C.; and<br>DISH NETWORK SERVICE L.L.C.,<br><br>Defendants. | Civil Action No. 2:22-CV-00076-JRG<br><br>MEMBER CASE |

**DEFENDANTS' P.R. 3-3 INVALIDITY CONTENTIONS**

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4. U.S. Patent Publication No. 2002/0154,055 ("Davis '055") ..... 24

5. U.S. Patent No. 6,600,730 ("Davis '730") ..... 25

6. International Patent Publication No. WO 00/67401 ("Gregoire") ..... 25

7. European Patent Application EP 1 071 286 ("Inose") ..... 26

8. U.S. Patent No. 7,954,127 ("James") ..... 26

9. Korean Patent Application No. 0142730 ("Kang") ..... 27

10. U.S. Patent No. 6,697,603 ("Lovinggood") ..... 27

11. U.S. Patent No. 5,276,904 ("Mutzig") ..... 28

12. U.S. Patent No. 5,959,592 ("Petruzzelli") ..... 28

13. U.S. Patent Publication No. 2003/0165200 ("Pugel '200") ..... 29

14. U.S. Patent No. 6,134,419 ("Williams '419") ..... 30

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1. International Patent Publication No. WO 00/03542 ("Ardemagni") ..... 31
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3. U.S. Patent Publication No. 2002/0154,055 ("Davis '055") ..... 32
4. U.S. Patent No. 6,600,730 ("Davis '730") ..... 33
5. International Patent Publication No. WO 02/065771 ("Fisk") ..... 33
6. International Patent Publication No. WO 00/67401 ("Gregoire") ..... 34
7. U.S. Patent No. 8,601,519 ("Hicks") ..... 34
8. Korean Patent Application No. 0142730 ("Kang") ..... 35
9. U.S. Patent No. 5,276,904 ("Mutzig") ..... 35
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1. Indefiniteness ..... 509
2. Lack of Written Description and/or Enablement ..... 518

## EXHIBITS AND APPENDICES

| | |
|---|---|
| **Exhibits A1 – A15** | Invalidity Claim Charts for Primary References for ’576 Patent |
| **Exhibits B1 – B13** | Invalidity Claim Charts for Primary References for ’715 Patent |
| **Exhibits C1 – C14** | Invalidity Claim Charts for Primary References for ’008 Patent |
| **Appendix A** | Additional References and Obviousness Chart for ’576 Patent |
| **Appendix B** | Additional References and Obviousness Chart for ’715 Patent |
| **Appendix C** | Additional References and Obviousness Chart for ’008 Patent |

Pursuant to P.R. 3-3 and the Court's Docket Control Order (Dkt. 49), Defendants DISH Network Corporation, DISH Network L.L.C., and DISH Network Service L.L.C. (collectively, "Defendants") hereby provide these P.R. 3-3 Invalidity Contentions ("Invalidity Contentions") to Plaintiff Entropic Communications, LLC ("Plaintiff" or "Entropic").

## I. INTRODUCTORY STATEMENT

These Invalidity Contentions are based on Defendants' current knowledge and understanding of U.S. Patent Nos. 7,130,576 ("the '576 patent"); 7,542,715 ("the '715 patent"); and 8,792,008 ("the '008 patent") (collectively, "the Asserted Patents") and the prior art, along with Defendants' understanding of Plaintiff's infringement allegations and apparent claim interpretations based on those allegations, as set forth in Plaintiff's Disclosure of Asserted Claims and Infringement Contentions ("Infringement Contentions"). These Invalidity Contentions should not be construed to waive any objections to Plaintiff's Infringement Contentions or as an admission that the Infringement Contentions were adequate or that Plaintiff's apparent claim interpretations are correct, have merit, or should be adopted. Indeed, Plaintiff's Infringement Contentions are deficient and fail to describe the accused functionality and Plaintiff's interpretation of the claim language in a manner that would allow Defendants to fully respond, including in these invalidity contentions. Defendants expressly reserve the right to amend these contentions based on amendments to Plaintiff's Infringement Contentions or when Plaintiff specifies its theories with greater clarity. Additionally, and as further explained below, where these Invalidity Contentions disclose that a prior art reference meets a claim limitation, such position may be based on Plaintiff's apparent claim interpretations in its Infringement Contentions; Defendants do not necessarily agree that such interpretations are correct, have merit, or should be adopted.

Defendants' investigation of the Asserted Patents, their file histories, and the prior art is ongoing, and Defendants expressly reserve the right to supplement these Invalidity Contentions

based on further discovery and in a manner consistent with the Federal Rules of Civil Procedure, the Local Patent Rules for the Eastern District of Texas, and any Docket Control Order, or otherwise in accordance with any order or direction of this Court or agreement of the parties. Defendants' ongoing investigation includes, but is not limited to, serving subpoenas on prior artists and inventors regarding prior art, seeking additional information related to the references and prior art systems disclosed in these Invalidity Contentions, seeking additional information regarding Plaintiff's Infringement Contentions and the products and services accused of infringement, and seeking information regarding any prior sales and/or uses by the original assignees of the Asserted Patents. Defendants also reserve the right to rely on any prior art identified or disclosed by non-parties to this action that are involved in a suit or action involving one or more of the Asserted Patents, as well as any prior art produced or disclosed by Entropic during the course of this litigation. Additionally, Defendants have not yet had the benefit of taking the depositions of the named inventors or those that worked with the named inventors, or of the named inventors, authors, and entities listed on any references or systems identified in these Invalidity Contentions.

## II. ASSERTED PATENTS AND CLAIMS

Plaintiff asserts the following claims from the Asserted Patents (collectively, "the Asserted Claims"):

| Asserted Patent | Asserted Claims |
|---|---|
| '576 patent | 14–23, 34–42 |
| '715 patent | 9–12 |
| '008 patent | 1–5, 7, 9–13, 15, 17, 18 |

Plaintiff asserts a priority date for the '576 and '715 patents of November 7, 2001, and for the '008 patent of September 8, 2011. Reference to an "asserted priority date" should not be construed to mean that Defendants agree that the Asserted Patents are in fact entitled to such priority dates, or that Plaintiff has provided proper notice as to its contentions for priority dates.

P.R. 3-2(b) requires Plaintiff to produce, contemporaneously with its Disclosure of Asserted Claims and Infringement Contentions," "[a]ll documents evidencing the conception, reduction to practice, design, and development of each claimed invention, which were created on or before the date of application for the patent in suit or the priority date identified pursuant to P.R. 3-1(e), whichever is earlier." Plaintiff did not produce any documents pursuant to P.R. 3-2(b). Defendants thus understand that Plaintiff is not asserting an invention date, or conception, reduction to practice, design, and/or development of the claimed invention, prior to the asserted priority dates identified above. To the extent Plaintiff later properly alleges that any such activities occurred prior to the priority dates identified above, Defendants reserve the right to object to such belated changes in position and/or to supplement these Invalidity Contentions to address any such contention, including by identifying and/or charting additional prior art that may become relevant in view of such assertion. Likewise, to the extent Plaintiff successfully establishes an invention date before any of the prior-art references relied on by Defendants, then those references serve as evidence of secondary considerations of obviousness, particularly, contemporaneous invention by others. To the extent Plaintiff alleges that any prior art relied on in these Invalidity Contentions does not actually qualify as prior art to the Asserted Patent, Defendants reserve the right to rebut those allegations (*e.g.*, by demonstrating an earlier critical date for the challenged prior art and/or a later priority date and/or date of invention for a particular Asserted Claim). Defendants also reserve the right to rely on additional documents, information, and evidence to demonstrate public availability or public availability by a certain date of a prior art reference or to rebut any efforts by Plaintiff to allege any reference was not publicly available or publicly available by a certain date or otherwise available as prior art.

For purposes of these contentions, Defendants address only those claims specifically asserted by Plaintiff. Defendants reserve the right to amend or supplement this disclosure as

necessary in view of any changes or amendments made, for any reason, to Plaintiff's infringement theories, infringement contentions, or Asserted Claims, including to Plaintiff's asserted priority and/or invention date(s).

## III. CLAIM CONSTRUCTION

To the extent that these Invalidity Contentions rely on or otherwise embody particular constructions of terms or phrases in the Asserted Claims, Defendants are not conceding that any such constructions are proper. For purposes of these Invalidity Contentions, Defendants may adopt alternative claim construction positions. In particular, portions of these Invalidity Contentions, including the claim charts attached as exhibits, may be based on the underlying claim constructions and/or interpretations in Plaintiff's Infringement Contentions, to the extent such constructions and/or interpretations are understood by Defendants. Defendants do not concede that any such constructions or interpretations by Plaintiff are proper, and expressly reserve the right to contest any such constructions.

Throughout the attached Exhibits, Defendants provide examples of where references disclose subject matter recited in preambles, without regard to whether the preambles are properly considered to be limitations of the Asserted Claims. Defendants reserve the right to argue, at the appropriate stage of this case, that the preambles are or are not limitations. Further, the fact that Defendants provide examples of any limitation does not mean that Defendants believe that the limitation is defined, or otherwise enabled, or comports with the requirements of the patent statute, including, but not limited to, 35 U.S.C. § 112.

Nothing disclosed herein is an admission or acknowledgement that any of Defendants' products or services infringes any of the Asserted Claims. Defendants reserve the right to supplement, modify, or otherwise amend these Invalidity Contentions, including based on the Court's claim construction rulings or opinions or the parties' positions or arguments taken in

connection with the claim construction process. Moreover, Defendants reserve the right to rely on any disclosures in the accompanying P.R. 3-4(b) production as it believes necessary in view of positions Plaintiff may take with respect to the scope and meaning of the Asserted Claims.

## IV. P.R. 3-3(a) – IDENTIFICATION OF PRIOR ART[1]

### A. '576 Patent

#### 1. Prior Art Patents

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| 3,051,938 | United States | August 28, 1962 |
| 4,109,281 | United States | August 22, 1978 |
| 4,864,613 | United States | September 5, 1989 |
| 5,073,930 | United States | December 19, 1991 |
| 5,173,775 | United States | December 22, 1991 |
| 5,103,459 | United States | April 7, 1992 |
| 5,150,247 | United States | September 22, 1992 |
| 5,206,954 | United States | April 27, 1993 |
| JPH05316062A | Japan | November 26, 1993 |
| 5,276,904 | United States | January 4, 1994 |
| WO 1996008892 | United States | March 21, 1996 |
| EP 0740434 A1 | Spain / Germany | April 29, 1996 |
| 5,585,850 | United States | December 17, 1996 |
| 5,588,022 | United States | December 24, 1996 |
| 5,724,091 | United States | March 3, 1998 |
| KR0142730B1 | South Korea | April 3, 1998 |
| EP 0899951 A1 | France | August 24, 1998 |
| 5,883,661 | United States | March 16, 1999 |
| 5,936,660 | United States | August 10, 1999 |

[1] Defendants also hereby identify any systems or products that embody the technology described in any patent or publication identified in these Invalidity Contentions. Defendants reserve the right to rely on any documents or other evidence regarding any such systems.

[2] The dates in this column are the latest dates on which the patents or publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| JP PAT APP 11243495 A (MAT) | Japan | September 7, 1999 |
| 5,959,592 | United States | September 28, 1999 |
| 5,970,386 | United States | October 19, 1999 |
| JPH11317715A | Japan | November 16, 1999 |
| EP 1071286 A1 | Japan | January 11, 2000 |
| WO 2000003542 A1 | Italy | January 20, 2000 |
| 6,078,783 | United States | June 20, 2000 (Filed September 30, 1997) |
| 6,122,482 | United States | September 19, 2000 |
| 6,134,419 | United States | October 17, 2000 |
| WO 2000067401 A2 | United States | November 9, 2000 |
| WO 2001/05156 A1 | United States | January 18, 2001 (Filed July 7, 2000; Priority to July 8, 1999) |
| JP2001128138 | Japan | May 11, 2001 |
| CA 2416790 A1 | Canada | February 7, 2002 (Filed July 30, 2001; Priority to August 1, 2000) |
| 2002/0038458 | United States | March 28, 2002 (Filed March 13, 2001; Priority to April 8, 1998) |
| 6,378,000 | United States | April 23, 2002 (Filed April 29, 1999) |
| JP2002135745 | Japan | May 10, 2002 |
| 2002/0066102 | United States | May 30, 2002 (Filed November 29, 2000) |
| 6,430,233 | United States | August 6, 2002 (Filed August 30, 1999) |
| 6,430,742 | United States | August 6, 2002 (Filed August 11, 1998) |
| 2002/0116714 | United States | August 22, 2002 (Filed February 12, 2002) |
| 2002/0154055 | United States | October 24, 2002 (Filed April 15, 2002; Priority to April 18, 2001) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| 6,480,551 | United States | November 12, 2002 (Filed November 17, 1998) |
| 6,486,907 | United States | November 26, 2002 (Filed July 23, 1997) |
| 6,493,873 | United States | December 10, 2002 (Filed January 20, 1998; Priority to January 27, 1997) |
| 6,501,423 | United States | December 31, 2002 (Filed May 6, 2002; Priority to April 14, 2000) |
| 2003/0043260 | United States | March 6, 2003 (Filed January 9, 2002; Priority to August 29, 2001) |
| 6,600,730 | United States | July 29, 2003 (Filed August 20, 1998) |
| 2003/0165200 | United States | September 4, 2003 (Filed August 30, 2001) |
| 6,622,307 | United States | September 16, 2003 (Filed March 26, 1999) |
| 6,678,737 | United States | January 13, 2004 (Filed April 28, 2000) |
| 6,697,603 | United States | February 24, 2004 (Filed December 13, 1999) |
| 6,704,372 | United States | March 9, 2004 (Filed September 18, 2001) |
| 6,738,434 | United States | May 18, 2004 (Filed August 28, 2002; Priority to July 1, 1999) |
| 6,745,392 | United States | June 1, 2004 (Filed September 8, 1999) |
| 6,888,888 | United States | May 3, 2005 (Filed June 26, 2001) |
| 6,950,009 | United States | September 27, 2005 (Filed June 17, 2003; Priority to November 29, 1996) |
| 6,816,485 | United States | November 9, 2004 (Filed Oct. 17, 2002) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| 6,970,717 | United States | November 29, 2005 (Filed February 12, 2002; Priority to January 12, 2001) |
| 7,099,951 | United States | August 29, 2006 (Filed May 24, 2001) |
| 7,123,649 | United States | October 17, 2006 (Filed November 3, 2000) |
| 7,200,377 | United States | April 3, 2007 (Filed June 6, 2001) |
| 7,215,679 | United States | May 8, 2007 (Filed August 30, 2001) |
| EP PAT 1301030 B1 | France | June 13, 2007 (Filed August 7, 2002; Priority to August 30, 2001) |
| 7,257,132 | United States | August 14, 2007 (Filed February 5, 1999) |
| 7,263,713 | United States | August 28, 2007 (Filed February 26, 2001; Priority to March 1, 2000) |
| 7,299,485 | United States | November 20, 2007 (Filed June 23, 2006; Priority to December 23, 1994) |
| 7,301,900 | United States | November 27, 2007 (Filed May 24, 2001) |
| 7,346,918 | United States | March 18, 2008 (Filed December 27, 2000) |
| 7,353,004 | United States | April 1, 2008 (Filed June 14, 2002; Priority to November 1, 2001) |
| 7,359,447 | United States | April 15, 2008 (Filed February 3, 2003; Priority to February 19, 2002) |
| 7,376,387 | United States | June 20, 2008 (Filed December 28, 1999) |
| 7,954,127 | United States | May 31, 2011 (Filed September 25, 2002) |

## 2. Prior Art Publications

| Title, Author(s), and Publisher | Date of Publication[3] |
|---|---|
| Communication Systems (4th ed.), A. Bruce Carlson et al., McGraw-Hill Higher Education | 2002 |
| Digital Communication Systems Design, Martin S. Roden, Prentice-Hall, Inc. Englewood Cliffs, New Jersey | 1988 |
| Direct Broadcast Satellite Communications: An MPEG Enabled Service, Donald C. Mead, Prentice-Hall, Inc., Upper Saddle River, New Jersey | 2000 |
| TR 101 201 v.1.1.1 (1997-10) Technical Report: Digital Video broadcasting (DVB); Interaction channel for Satellite Master Antenna TR (SMATV) distribution systems; Guidelines for versions based on satellite and coaxial sections, European Telecommunications Standards Institute / European Broadcasting Union | 1997 |
| ETSI 01 699 V1.1.1 Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification, European Telecommunications Standards Institute and European Broadcasting Union | 1999 |
| EN 300 473 v1.1.2 (1997-08) European Standard: Digital Video broadcasting (DVB); Satellite Master Antenna Television (SMATV) distribution systems, European Telecommunications Standards Institute / European Broadcasting Union | 1997 |
| Satellite Communications, 3d ed., Dennis Roddy, McGraw-Hill | 2001 |
| The Equivalence of Digital and Analog Signal Processing, K. Steiglitz, Information and Control | 1965 |
| DVB CPT rev 1.2; DVB Technical Module Sub-Group On Copy Protection Technologies: Digital Video Broadcasting Call For Proposals for Content Protection & Copy Management Technologies | 2001 |
| EN 50221; Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications | 1997 |
| Enhancing TCP Over Satellite Channels Using Standard Mechanisms, Allman, et al., Best Current Practice | 1999 |
| ETS 300 473; Digital Broadcasting systems for television sound and data services; Satellite Master Antenna Television (SMATV) distribution systems: European Telecommunication Standard | 1995 |
| Digital Transmission Content Protection Specification Volume 1; Revision 1.2 (Information Version) | 2001 |

[3] The dates in this column are the latest dates on which the publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

## B. '715 Patent

### 1. Prior Art Patents

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 3,051,938 | United States | August 28, 1962 |
| 4,109,281 | United States | August 22, 1978 |
| 4,864,613 | United States | September 5, 1989 |
| 5,073,930 | United States | December 19, 1991 |
| 5,173,775 | United States | December 22, 1991 |
| 5,103,459 | United States | April 7, 1992 |
| 5,150,247 | United States | September 22, 1992 |
| 5,206,954 | United States | April 27, 1993 |
| JPH05316062A | Japan | November 26, 1993 |
| 5,276,904 | United States | January 4, 1994 |
| WO 1996008892 | United States | March 21, 1996 |
| EP 0740434 A1 | Spain / Germany | April 29, 1996 |
| 5,585,850 | United States | December 17, 1996 |
| 5,588,022 | United States | December 24, 1996 |
| 5,724,091 | United States | March 3, 1998 |
| KR0142730B1 | South Korea | April 3, 1998 |
| EP 0899951 A1 | France | August 24, 1998 |
| 5,883,661 | United States | March 16, 1999 |
| 5,936,660 | United States | August 10, 1999 |
| JP PAT APP 11243495 A | Japan | September 7, 1999 |
| 5,959,592 | United States | September 28, 1999 |
| 5,970,386 | United States | October 19, 1999 |
| JPH11317715A | Japan | November 16, 1999 |
| 6,005,861 | United States | December 21, 1999 |
| EP 1071286 A1 | Japan | January 11, 2000 |
| WO 2000003542 A1 | Italy | January 20, 2000 |

[4] The dates in this column are the latest dates on which the patents or publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 6,078,783 | United States | June 20, 2000 (Filed September 30, 1997) |
| WO 2000/004707 A1 | United States | January 27, 2000 |
| 6,122,482 | United States | September 19, 2000 |
| 6,134,419 | United States | October 17, 2000 |
| WO 2000067401 A2 | United States | November 9, 2000 |
| WO 2001/05156 A1 | United States | January 18, 2001 (Filed July 7, 2000; Priority to July 8, 1999) |
| JP2001128138 | Japan | May 11, 2001 |
| WO 2002/001318 A3 | United States | January 3, 2002 (Filed June 18, 2001; Priority to June 23, 2000) |
| CA 2416790 A1 | Canada | February 7, 2002 (Filed July 30, 2001; Priority to August 1, 2000) |
| 2002/0038458 | United States | March 28, 2002 (Filed March 13, 2001; Priority to April 8, 1998) |
| 6,378,000 | United States | April 23, 2002 (Filed April 29, 1999) |
| 2002/0056140 | United States | May 9, 2002 (Filed February 26, 201; Priority to March 1, 2000) |
| JP2002135745 | Japan | May 10, 2002 |
| 2002/0066102 | United States | May 30, 2002 (Filed November 29, 2000) |
| 6,430,233 | United States | August 6, 2002 (Filed August 30, 1999) |
| 6,430,742 | United States | August 6, 2002 (Filed August 11, 1998) |
| 2002/0116714 | United States | August 22, 2002 (Filed February 12, 2002) |
| 2002/0154055 | United States | October 24, 2002 (Filed April 15, 2002; Priority to April 18, 2001) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 6,480,551 | United States | November 12, 2002 (Filed November 17, 1998) |
| 6,486,907 | United States | November 26, 2002 (Filed July 23, 1997) |
| 6,493,873 | United States | December 10, 2002 (Filed January 20, 1998; Priority to January 27, 1997) |
| 6,501,423 | United States | December 31, 2002 (Filed May 6, 2002; Priority to April 14, 2000) |
| 2003/0043260 | United States | March 6, 2003 (Filed January 9, 2002; Priority to August 29, 2001) |
| 2003/0140345 | United States | July 24, 2003 (Filed February 9, 2001) |
| 6,600,730 | United States | July 29, 2003 (Filed August 20, 1998) |
| 2003/0165200 | United States | September 4, 2003 (Filed August 30, 2001) |
| 6,622,307 | United States | September 16, 2003 (Filed March 26, 1999) |
| 6,678,737 | United States | January 13, 2004 (Filed April 28, 2000) |
| 6,697,603 | United States | February 24, 2004 (Filed December 13, 1999) |
| 6,704,372 | United States | March 9, 2004 (Filed Sep. 18, 2001) |
| 6,738,434 | United States | May 18, 2004 (Filed August 28, 2002; Priority to July 1, 1999) |
| 6,745,392 | United States | June 1, 2004 (Filed September 8,1999) |
| 6,816,485 | United States | November 9, 2004 (Filed Oct. 17, 2002) |
| 2004/0250273 | United States | December 9, 2004 (Filed December 14, 2001; Priority to April 2, 2001) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 6,889,385 | United States | March 3, 2005 (Filed June 23, 2000; Priority to January 14, 2000) |
| 6,888,888 | United States | May 3, 2005 (Filed June 26, 2001) |
| 6,950,009 | United States | September 27, 2005 (Filed June 17, 2003; Priority to November 29, 1996) |
| 6,965,593 | United States | November 15, 2005 (Filed March 4, 2002); Priority to September 2, 1997) |
| 6,970,717 | United States | November 29, 2005 (Filed February 12, 2002; Priority to January 12, 2001) |
| 7,099,951 | United States | August 29, 2006 (Filed May 24, 2001) |
| 7,123,649 | United States | October 17, 2006 (Filed November 3, 2000) |
| 7,155,734 | United States | December 26, 2006 (Filed February 29, 2000; Priority to April 16, 1999) |
| 7,200,377 | United States | April 3, 2007 (Filed June 6, 2001) |
| 7,200,855 | United States | April 3, 2007 (Filed May 24, 2001) |
| 7,215,679 | United States | May 8, 2007 (Filed August 30, 2001) |
| EP PAT 1301030 B1 | France | June 13, 2007 (Filed August 7, 2002; Priority to August 30, 2001) |
| 7,257,132 | United States | August 14, 2007 (Filed February 5, 1999) |
| 7,263,713 | United States | August 28, 2007 (Filed February 26, 2001; Priority to March 1, 2000) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 7,299,485 | United States | November 20, 2007 (Filed June 23, 2006; Priority to December 23, 1994) |
| 7,301,900 | United States | November 27, 2007 (Filed May 24, 2001) |
| 7,346,918 | United States | March 18, 2008 (Filed December 27, 2000) |
| 7,353,004 | United States | April 1, 2008 (Filed June 14, 2002; Priority to November 1, 2001) |
| 7,359,447 | United States | April 15, 2008 (Filed February 3, 2003; Priority to February 19, 2002) |
| 7,376,387 | United States | June 20, 2008 (Filed December 28, 1999) |
| 7,954,127 | United States | May 31, 2011 (Filed September 25, 2002) |
| 2013/0149958 | United States | June 13, 2013 (Filed February 13, 2013; Priority to April 18, 2001) |
| 8,601,519 | United States | December 3, 2013 (Filed December 28, 2000) |

**2. Prior Art Publications**

| Title, Author(s), and Publisher | Date of Publication[5] |
|---|---|
| Communication Systems (4th ed.), A. Bruce Carlson et al., McGraw-Hill Higher Education | 2002 |
| Digital Communication Systems Design, Martin S. Roden, Prentice-Hall, Inc. Englewood Cliffs, New Jersey | 1988 |
| Direct Broadcast Satellite Communications: An MPEG Enabled Service, Donald C. Mead, Prentice-Hall, Inc., Upper Saddle River, New Jersey | 2000 |

[5] The dates in this column are the latest dates on which the publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Title, Author(s), and Publisher | Date of Publication[5] |
|---|---|
| TR 101 201 v.1.1.1 (1997-10) Technical Report: Digital Video broadcasting (DVB); Interaction channel for Satellite Master Antenna TR (SMATV) distribution systems; Guidelines for versions based on satellite and coaxial sections, European Telecommunications Standards Institute / European Broadcasting Union | 1997 |
| ETSI TS 101 699 V1.1.1 Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification, European Telecommunications Standards Institute and European Broadcasting Union | 1999 |
| EN 300 473 v1.1.2 (1997-08) European Standard: Digital Video broadcasting (DVB); Satellite Master Antenna Television (SMATV) distribution systems, European Telecommunications Standards Institute / European Broadcasting Union | 1997 |
| Satellite Communications, 3d ed., Dennis Roddy, McGraw-Hill | 2001 |
| Television Goes Digital, Darcy Gerbarg (ed), Springer Science + Business Media LLC | 2009 |
| The Equivalence of Digital and Analog Signal Processing, K. Steiglitz, Information and Control | 1965 |
| DVB CPT rev 1.2; DVB Technical Module Sub-Group On Copy Protection Technologies: Digital Video Broadcasting Call For Proposals for Content Protection & Copy Management Technologies | 2001 |
| EN 50221; Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications | 1997 |
| Enhancing TCP Over Satellite Channels Using Standard Mechanisms, Allman, et al., Best Current Practice | 1999 |
| ETS 300 473; Digital Broadcasting systems for television sound and data services; Satellite Master Antenna Television (SMATV) distribution systems: European Telecommunication Standard | 1995 |
| Digital Transmission Content Protection Specification Volume 1; Revision 1.2 (Information Version) | 2001 |

## C. '008 Patent

### 1. Prior Art Patents

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[6] |
|---|---|---|
| 5,263,182 | United States | November 16, 1993 |
| 5,535,240 | United States | July 9, 1996 |
| 5,630,227 | United States | May 13, 1997 |
| 5,675,371 | United States | October 7, 1997 |
| 5,808,671 | United States | September 15, 1998 |
| 5,874,992 | United States | February 23, 1999 |
| 6,002,422 | United States | December 14, 1999 |
| 6,031,878 | United States | February 29, 2000 |
| 6,278,493 | United States | August 21, 2001 |
| CN2471036Y | China | January 9, 2002 |
| 6,356,539 | United States | March 12, 2002 |
| 6,445,907 | United States | September 3, 2002 |
| 6,631,255 | United States | October 7, 2003 |
| 6,704,372 | United States | March 9, 2004 |
| 2004/0093370 | United States | May 13, 2004 |
| 2004/0117834 | United States | June 17, 2004 |
| 2005/0114879 | United States | May 26, 2005 |
| 2005/0190777 | United States | September 1, 2005 |
| 7,010,265 | United States | March 7, 2006 |
| 7,027,520 | United States | April 11, 2006 |
| 7,116,958 | United States | October 3, 2006 |
| 7,149,470 | United States | December 12, 2006 |
| 2007/0286311 | United States | December 13, 2007 |
| 2008/0046947 | United States | February 21, 2008 |
| 2008/0168520 | United States | July 10, 2008 |
| 7,403,486 | United States | July 22, 2008 |
| 2008/0240229 | United States | October 2, 2008 |
| 7,489,641 | United States | February 10, 2009 |

[6] The dates in this column are the latest dates on which the patents or publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[6] |
|---|---|---|
| CN102164304A | China | April 8, 2009 |
| 7,558,551 | United States | July 7, 2009 |
| 7,573,398 | United States | August 11, 2009 |
| 2009/0290602 | United States | November 26, 2009 |
| 7,739,717 | United States | June 15, 2010 |
| 7,788,684 | United States | August 31, 2010 |
| CN101404782A | China | February 23, 2011 |
| 7,924,348 | United States | April 12, 2011 |
| 2011/0176060 | United States | July 21, 2011 |
| 8,077,760 | United States | December 13, 2011 (Filed November 6, 2008) |
| 8,126,044 | United States | February 28, 2012 (Filed Oct. 25, 2006) |
| 8,175,191 | United States | May 8, 2012 (Filed February 20, 2008) |
| 2012/0278826 | United States | November 1, 2012 (Filed April 27, 2011) |
| 8,345,798 | United States | January 1, 2013 (Filed March 31, 2009) |
| 8,352,995 | United States | January 8, 2013 (Filed January 7, 2011) |
| 8,364,107 | United States | January 29, 2013 (Filed Sep. 15, 2010) |
| 2013/0091528 | United States | April 11, 2013 (Filed May 23, 2011) |
| 8,424,049 | United States | April 16, 2013 (Filed August 25, 2006) |
| 8,472,562 | United States | June 25, 2013 (Priority to March 31, 2003) |
| 8,494,091 | United States | July 23, 2013 (Filed May 30, 2012) |
| 8,582,694 | United States | November 12, 2013 (Filed April 24, 2012) |
| 8,649,421 | United States | February 11, 2014 (Filed February 17, 2012; Priority to February 18, 2011) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[6] |
|---|---|---|
| 8,848,110 | United States | September 30, 2014 (Filed May 28, 2010) |
| 8,891,699 | United States | November 18, 2014 (Filed March 23, 2012; Priority to March 25, 2011) |
| 8,897,147 | United States | November 25, 2014 (Priority to March 25, 2011) |
| 8,948,316 | United States | February 3, 2015 (Filed March 23, 2012; Priority to March 25, 2011) |
| 9,071,397 | United States | June 30, 2015 (Filed March 23, 2012; Priority to March 25, 2011) |
| 9,130,790 | United States | September 8, 2015 (Filed March 23, 2012; Priority to March 25, 2011) |
| 9,252,917 | United States | February 2, 2016 (Filed March 23, 2012; Priority to March 25, 2011) |
| 9,338,488 | United States | May 10, 2016 (Field April 6, 2011) |
| 9,344,262 | United States | May 17, 2016 (Filed January 20, 2012; Priority to January 21, 2011) |
| 9,485,010 | United States | November 1, 2016 (Filed March 16, 2006) |
| 9,686,594 | United States | June 20, 2017 (Filed March 30, 2012; Priority to November 11, 2011) |

**2. Prior Art Publications**

| Title, Author(s), and Publisher | Date of Publication[7] |
|---|---|
| Communication Systems (4th ed.), A. Bruce Carlson et al., McGraw-Hill Higher Education | 2002 |

[7] The dates in this column are the latest dates on which the publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Title, Author(s), and Publisher | Date of Publication[7] |
|---|---|
| Data Communications and Networking, Behrouz A. Forouzan | September 30, 2003 |
| DOCSIS Best Practices and Guidelines: Cable Modem Buffer Control CM-GL-Buffer-V01-110915, CableLabs | September 15, 2011 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: MAC and Upper Layer Protocols Interface Specification - CM-SP-MULPIv3.0-I16-110623, Cable Television Laboratories, Inc. | June 23, 2011 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: Operations Support System Interface Specification - CM-SP-OSSI3.0-I05-071206, Cable Television Laboratories, Inc. | December 6, 2007 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: Operations Support System Interface Specification - CM-SP-OSSIv3.0-I15-110623, Cable Television Laboratories, Inc. | June 23, 2011 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: Physical Layer Specification - CM-SP-PHYv3.0-I09-101008, Cable Television Laboratories, Inc. | October 8, 2010 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: Security Specification - CM-SP-SECv3.0-I13-100611, Cable Television Laboratories, Inc. | June 11, 2010 |
| Digital Satellite Equipment Control (DiSEqC) Application Information for LNBs and Switchers | February 25, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Applications Information for Using a "PIC" Microcontroller | June 1, 1999 |
| Digital Satellite Equipment Control (DiSEqC) Applications Information for Tuner-Receiver/IRDs | April 12, 1996 |
| Digital Satellite Equipment Control (DiSEqC) Bus Functional Specification | February 25, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Logos and Conditions of Use | February 25, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Positioner Application Note | March 15, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Reset Circuits for the Slave Microcontroller | August 12, 1996 |
| Digital Satellite Equipment Control (DiSEqC) Simple "ToneBurst" Detection Circuit | August 12, 1996 |
| Digital Satellite Equipment Control (DiSEqC) Slave Microcontroller | February 25, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Update and Recommendations for Implementation | February 25, 1998 |
| DVB-S2: The Second Generation Standard for Satellite Broad-band Services, Alberto Morello and Vittoria Mignone | January 2006 |

| Title, Author(s), and Publisher | Date of Publication[7] |
|---|---|
| Effects of Rain Attenuation on Satellite Video Transmission, Yee Hui Lee and Stefan Winkler | May 2011 |
| ETSI EN 301 790 v1.5.1 (2009-05) European Standard: Digital Video Broadcasting (DVB); Interaction channel for satellite distribution systems, European Telecommunications Standards Institute and European Broadcasting Union | 2009 |
| Final Draft ETSI EN 302 307 v1.2.1 (2009-04) European Standard: Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2), European Telecommunications Standards Institute and European Broadcasting Union | 2009 |
| ETSI ER 101 790 V1.4.1 European Standard: Digital Video Broadcasting (DVB); Interaction channel for Satellite Distribution Systems; Guidelines for the use of EN 301 790, European Telecommunications Standards Institute and European Broadcasting Union | 2009 |
| ETSI TR 101 290 V1.2.1 Digital Video Broadcasting (DVB); Measurement guidelines for DVB systems, European Telecommunications Standards Institute and European Broadcasting Union | 2001 |
| ETSI TR 101 790 V1.4.1 Digital Video Broadcasting (DVB); Interaction channel for Satellite Distribution Systems; Guidelines for the use of EN 301 790, European Telecommunications Standards Institute and European Broadcasting Union | 2009 |
| ETSI TR 102 376 V1.1.1 European Standard: Digital Video Broadcasting (DVB) User guidelines for the second generation system for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2), European Telecommunications Standards Institute and European Broadcasting Union | 2005 |
| ETSI TS 101 699 V1.1.1 Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification, European Telecommunications Standards Institute and European Broadcasting Union | 1999 |
| An HDTV Broadcasting System Utilizing a Bandwidth Compression Technique - MUSE, Yuichi Ninomiya, et al. | December 1987 |
| Handbook on Satellite Communications (HSC) (Edition 3), International Telecommunication Union - Radio Communication Sector (ITU-R) | 2002 |
| Recommendation ITU-R BO.1294 (BO.1294) | 1997 |

| Title, Author(s), and Publisher | Date of Publication[7] |
|---|---|
| Recommendation ITU-R BO.1516 (BO.1516) | 2001 |
| Recommendation ITU-R S.1878 (S.1878) | 2010 |
| Migration to Full Digital Channel Loading on a Cable System, Marc Ryba, Motorola Broadband Communications Sector | 2001 |
| Modern Cable Television (2d ed.), Walter Ciciora et al. | 2004 |
| Handbook: Spectrum Monitoring, International Telecommunication Union - Radio Communication Sector (ITU-R) | 2011 |
| Satellite Direct-to-Home, Stephen Dulac and John Godwin | January 2006 |
| The Equivalence of Digital and Analog Signal Processing, K. Steiglitz, Information and Control | 1965 |

### 3. Prior Art Sales/Public Uses

| Item Offered for Sale and/or Publicly Used or Known | Date of Offer / Public Use / Knowledge[8] | Person or Entity Who Made and Received Offer, Made Public Use, or Made Information Known or to Whom Made Known |
|---|---|---|
| Full Band Capture Chip BCM3124/BCM3128 | On or before June 13, 2011 | Broadcom to general public |
| Full Band Capture Chip BCM4528 | On or before September 5, 2011 | Broadcom to general public |
| Super Buddy Satellite Meter | On or before December 2009 | Applied Instruments, Inc. to general public |

## V. PRIMARY REFERENCES

The primary prior art references that Defendants rely on for the Asserted Patents are identified below. The exhibits to these Invalidity Contentions contain claim charts for the primary prior art references. Obviousness combinations of the primary prior art references are separately identified throughout these Invalidity Contentions (including below and in Appendices A–C).

[8] The dates in this column are the latest dates on which the systems were publicly used or known. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

Defendants' reliance on each prior art reference identified throughout these Invalidity Contentions (whether primary references or obviousness references) includes the reference itself, anything incorporated by the reference, any system embodying the reference, and any testimony by those with knowledge of the reference, such as named authors and inventors.[9] All such documents and information shall be considered one prior art reference to the extent they describe a single prior art system or solution, or the closely related work of a single prior art author. In addition to the specific references below, Defendants reserve the right to rely on all admitted prior art in the Asserted Patents and their file histories, as well as anything admitted by prior art by Plaintiff or its experts or representatives. Defendants reserve the right to supplement these Invalidity Contentions as discovery reveals further information about prior use and/or prior public knowledge of products, methods, or systems that Defendants have reason to believe anticipate or render obvious one or more of the Asserted Claims. Defendants further reserve the right to identify and rely on additional prior art in Plaintiff's possession, custody, or control that has not yet been produced or identified to Defendants.

## A. '576 Patent

The following primary references, alone or in combination with any other reference identified in this subsection or the references identified in Appendix A, render invalid one or more of the Asserted Claims of the '576 patent.

### 1. International Patent Publication No. WO 00/03542 ("Ardemagni")

Ardemagni was filed on June 18, 1999, and published on January 20, 2000. Ardemagni qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and/or (b). Ardemagni

[9] For example, for each patent identified as a prior art reference in these Invalidity Contentions, Defendants reserve the right to rely on the patent itself and/or any system that practices or embodies the patent to demonstrate invalidity.

anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A1 provides representative, non-limiting examples of where Ardemagni discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Ardemagni does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Ardemagni alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Ardemagni with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**2. U.S. Patent No. 6,745,392 ("Basawapatna")**

Basawapatna was filed on September 8, 1999, and issued on June 1, 2004. Basawapatna qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and (e). Basawapatna anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A2 provides representative, non-limiting examples of where Basawapatna discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Basawapatna does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Basawapatna alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Basawapatna with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### 3. European Patent Application EP 0 740 434 ("Carnero")

Carnero published on October 30, 1997. Carnero qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and (b). Carnero anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A3 provides representative, non-limiting examples of where Carnero discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Carnero does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Carnero alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Carnero with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### 4. U.S. Patent Publication No. 2002/0154,055 ("Davis '055")

Davis '055 published on October 24, 2002, and claims priority to U.S. Provisional Patent App. No. 28/459301, which was filed on April 18, 2001. Davis '055 qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Davis '055 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A4 provides representative, non-limiting examples of where Davis '055 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Davis '055 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Davis '055 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Davis '055 with concepts from other prior art, including any of the other primary references

or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**5. U.S. Patent No. 6,600,730 ("Davis '730")**

Davis '730 was filed on August 20, 1998, and issued on July 29, 2003. Davis '730 qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Davis '730 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A5 provides representative, non-limiting examples of where Davis '730 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Davis '730 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Davis '730 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Davis '730 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**6. International Patent Publication No. WO 00/67401 ("Gregoire")**

Gregoire was filed as PCT No. US00/12401 on May 4, 2000, and published on November 9, 2000. Gregoire qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and/or (e). Gregoire anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A6 provides representative, non-limiting examples of where Gregoire discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Gregoire does not anticipate any Asserted Claim, such Asserted Claim would be

obvious in view of Gregoire alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Gregoire with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**7. European Patent Application EP 1 071 286 ("Inose")**

Inose published on July 20, 2000. Inose qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and (b). Inose anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A7 provides representative, non-limiting examples of where Inose discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Inose does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Inose alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Inose with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**8. U.S. Patent No. 7,954,127 ("James")**

James was filed on September 25, 2002, and issued on May 31, 2011. James qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). James anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A8 provides representative, non-limiting examples of where James discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that James does not anticipate any

Asserted Claim, such Asserted Claim would be obvious in view of James alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify James with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**9. Korean Patent Application No. 0142730 ("Kang")**

Kang published on November 25, 1996. Kang qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and (b). Kang anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A9 provides representative, non-limiting examples of where Kang discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Kang does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Kang alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Kang with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**10. U.S. Patent No. 6,697,603 ("Lovinggood")**

Lovinggood was filed on December 19, 1999, and issued on February 24, 2004. Lovinggood qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Lovinggood anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A10 provides representative, non-limiting examples of where Lovinggood discloses, either expressly

or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Lovinggood does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Lovinggood alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Lovinggood with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**11. U.S. Patent No. 5,276,904 ("Mutzig")**

Mutzig issued on January 4, 1994. Mutzig qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Mutzig anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A11 provides representative, non-limiting examples of where Mutzig discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Mutzig does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Mutzig alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Mutzig with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**12. U.S. Patent No. 5,959,592 ("Petruzzelli")**

Petruzzelli issued on September 29, 1999. Petruzzelli qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Petruzzelli anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted

Claims of the '576 patent. The claim chart attached as Exhibit A12 provides representative, non-limiting examples of where Petruzzelli discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Petruzzelli does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Petruzzelli alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Petruzzelli with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**13. U.S. Patent Publication No. 2003/0165200 ("Pugel '200")**

Pugel '200 was filed on August 30, 2001, and published on September 4, 2003. Pugel '200 qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Pugel '200 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A13 provides representative, non-limiting examples of where Pugel '200 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Pugel '200 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Pugel '200 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Pugel '200 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**14. U.S. Patent No. 6,134,419 ("Williams '419")**

Williams '419 issued on October 17, 2000. Williams '419 qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Williams '419 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A14 provides representative, non-limiting examples of where Williams '419 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Williams '419 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Williams '419 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Williams '419 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**15. U.S. Patent No. 6,493,873 ("Williams '873")**

Williams '873 was filed on January 20, 1998, and issued on December 10, 2002. Williams '873 qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Williams '873 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '873 patent. The claim chart attached as Exhibit A15 provides representative, non-limiting examples of where Williams '873 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Williams '873 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Williams '873 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Williams '873 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A

or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**B. '715 Patent**

The following primary references, alone or in combination with any other reference identified in this subsection or the references identified in Appendix A, render invalid one or more of the Asserted Claims of the '715 patent.

**1. International Patent Publication No. WO 00/03542 ("Ardemagni")**

Ardemagni was filed on June 18, 1999, and published on January 20, 2000. Ardemagni qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a) and/or (b). Ardemagni anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B1 provides representative, non-limiting examples of where Ardemagni discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Ardemagni does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Ardemagni alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Ardemagni with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**2. European Patent Application EP 0 740 434 ("Carnero")**

Carnero published on October 30, 1997. Carnero qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a) and (b). Carnero anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B2 provides representative, non-limiting

examples of where Carnero discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Carnero does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Carnero alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Carnero with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**3. U.S. Patent Publication No. 2002/0154,055 ("Davis '055")**

Davis '055 published on October 24, 2002, and claims priority to U.S. Provisional Patent App. No. 28/459301, which was filed on April 18, 2001. Davis '055 qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Davis '055 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B3 provides representative, non-limiting examples of where Davis '055 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Davis '055 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Davis '055 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Davis '055 with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**4. U.S. Patent No. 6,600,730 ("Davis '730")**

Davis '730 was filed on August 20, 1998, and issued on July 29, 2003. Davis '730 qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Davis '730 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B4 provides representative, non-limiting examples of where Davis '730 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Davis '730 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Davis '730 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Davis '730 with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**5. International Patent Publication No. WO 02/065771 ("Fisk")**

Fisk has an international filing date of February 9, 2001, and published on August 22, 2002. Fisk published in the English language and designates the United States. Fisk qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Fisk anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B5 provides representative, non-limiting examples of where Fisk discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Fisk does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Fisk alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Fisk with concepts from other prior art, including any of the other primary references or the

references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**6. International Patent Publication No. WO 00/67401 ("Gregoire")**

Gregoire was filed as PCT No. US00/12401 on May 4, 2000, and published on November 9, 2000. Gregoire qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a) and/or (e). Gregoire anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B6 provides representative, non-limiting examples of where Gregoire discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Gregoire does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Gregoire alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Gregoire with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**7. U.S. Patent No. 8,601,519 ("Hicks")**

Hicks was filed on December 28, 2000, and issued on December 3, 2013. Hicks qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Hicks anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B7 provides representative, non-limiting examples of where Hicks discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Hicks does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Hicks alone and/or in view of the

knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Hicks with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**8. Korean Patent Application No. 0142730 ("Kang")**

Kang published on November 25, 1996. Kang qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a) and (b). Kang anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B8 provides representative, non-limiting examples of where Kang discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Kang does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Kang alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Kang with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**9. U.S. Patent No. 5,276,904 ("Mutzig")**

Mutzig issued on January 4, 1994. Mutzig qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Mutzig anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B9 provides representative, non-limiting examples of where Mutzig discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Mutzig does not anticipate any

Asserted Claim, such Asserted Claim would be obvious in view of Mutzig alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Mutzig with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**10. U.S. Patent No. 7,263,713 ("Oishi")**

Oishi was filed on February 26, 2001, and issued on May 9, 2002. Oishi qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Oishi anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B10 provides representative, non-limiting examples of where Oishi discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Oishi does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Oishi alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Oishi with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**11. U.S. Patent No. 5,959,592 ("Petruzzelli")**

Petruzzelli issued on September 28, 1999. Petruzzelli qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Petruzzelli anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B11 provides representative, non-

limiting examples of where Petruzzelli discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Petruzzelli does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Petruzzelli alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Petruzzelli with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**12. U.S. Patent No. 6,134,419 ("Williams '419")**

Williams '419 issued on October 17, 2000. Williams '419 qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Williams '419 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B12 provides representative, non-limiting examples of where Williams '419 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Williams '419 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Williams '419 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Williams '419 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**13. U.S. Patent No. 6,493,873 ("Williams '873")**

Williams '873 was filed on January 20, 1998, and issued on December 10, 2002. Williams '873 qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Williams '873

anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B13 provides representative, non-limiting examples of where Williams '873 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Williams '873 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Williams '873 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Williams '873 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### C. '008 Patent

The following primary references, alone or in combination with any other reference identified in this subsection or the references identified in Appendix A, render invalid one or more of the Asserted Claims of the '008 patent.

#### 1. U.S. Patent Publication No. 2007/0286311 ("Coyne")

Coyne was filed on May 1, 2007, and published on December 13, 2007. Coyne qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Coyne anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C1 provides representative, non-limiting examples of where Coyne discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Coyne does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Coyne alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Coyne with concepts from other prior art, including any of the other primary

references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**2. U.S. Patent No. 5,808,671 ("Maycock")**

Maycock issued on September 15, 1998. Maycock qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Maycock anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C2 provides representative, non-limiting examples of where Maycock discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Maycock does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Maycock alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Maycock with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**3. U.S. Patent No. 7,403,486 ("Flask")**

Flask was filed on November 1, 2004, and issued on July 22, 2008. Flask qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Flask anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C3 provides representative, non-limiting examples of where Flask discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Flask does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Flask alone

and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Flask with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**4. U.S. Patent No. 5,874,992 ("Caporizzo")**

Caporizzo was filed on August 16, 1996, and issued on February 23, 1999. Caporizzo qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Caporizzo anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C4 provides representative, non-limiting examples of where Caporizzo discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Caporizzo does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Caporizzo alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Caporizzo with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**5. U.S. Patent No. 8,582,694 ("Velazquez")**

Velazquez was filed on April 24, 2012, issued on November 12, 2013, and claims priority to applications filed on October 20, 2010, June 16, 2010, and April 20, 2008. Velazquez qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(e). Velazquez anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C5 provides

representative, non-limiting examples of where Velazquez discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Velazquez does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Velazquez alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Velazquez with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**6. U.S. Patent 7,788,684 ("Petrovic")**

Petrovic issued on August 31, 2010. Petrovic qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Petrovic anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C6 provides representative, non-limiting examples of where Petrovic discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Petrovic does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Petrovic alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Petrovic with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**7. Broadcom Full Band Capture Chip System**

Broadcom's BCM3128 and BCM3124 full band capture cable chips were announced, publicly known and used, and available for sale on or before June 13, 2011, specifically in set-top

boxes (STBs) and gateways with DOCSIS 3.0, and/or the BCM3128/3128 chips were specifically disclosed as being used in in systems with DOCSIS 3.0. This Full Band Capture Chip System qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Additionally, Broadcom's BCM4528 full band capture satellite chip was announced, publicly known, and used, and available for sale on or before September 6, 2011. The Full Band Capture Chip System anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C7 provides representative, non-limiting examples of where the Full Band Capture Chip System discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that the Full Band Capture Chip System does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of the Full Band Capture Chip System alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify the Full Band Capture Chip System with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**8. U.S. Patent No. 8,126,044 ("Cavanagh")**

Cavanagh was filed on October 25, 2006, and issued on February 28, 2012. Cavanagh qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(e). Cavanagh anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C8 provides representative, non-limiting examples of where Cavanagh discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Cavanagh does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view

of Cavanagh alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Cavanagh with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**9. International Telecommunications Union ("ITU")**

ITU refers to at least the following documents from the International Telecommunications Union:

- ITU Handbook on Spectrum Monitoring (2011)
- ITU Handbook on Satellite Communications (3d ed. 2002)
- Rec. ITU-R BO.1294 (1997)
- Rec. ITU-R BO.1516 (2001)
- Rec. ITU-R S.1878 (2010)

These documents were publicly available prior to 2012. ITU qualifies as prior art to the '008 patent under at least 35 U.S.C. § 102(a) and/or (b). ITU anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C9 provides representative, non-limiting examples of where ITU discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that ITU does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of ITU alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify ITU with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### 10. Digital Video Broadband ("DVB")

DVB refers to at least the following documents related to Digital Video Broadband from the European Telecommunications Standards Institute:

- ETSI EN 301 790 V1.5.1 (Digital Video Broadcasting (DVB); Interaction channel for satellite distribution systems) (May 2009);
- ETSI EN 302 307 V1.2.1 (Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications) (April 2009);
- ETSI ER 101 790 V1.4.1 (Digital Video Broadcasting (DVB); Interaction channel for Satellite Distribution Systems; Guidelines for the use of EN 301 790) (July 2009);
- ETSI TR 102 376 V1.1.1 (Digital Video Broadcasting (DVB) User guidelines for the second generation system for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2)) (February 2005);
- ETSI TR 101 290 V1.2.1 (Digital Video Broadcasting (DVB); Measurement guidelines for DVB systems) (May 2001);
- Digital Satellite Equipment Control (DiSEqC) Specifications (1998), including, *e.g.*, Bus Functional Specification (February 1998); and
- Morello et al., *DVB-S2: The Second Generation Standard for Satellite Broad-band Services* (IEEE January 2006).

These documents were publicly available prior to 2011. DVB qualifies as prior art to the '008 patent under at least 35 U.S.C. § 102(a) and/or (b). DVB anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C10 provides representative, non-limiting examples of where DVB discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that DVB does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of DVB alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify DVB with concepts from other prior art, including any of the other primary references or the

references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**11. U.S. Patent No. 9,686,594 ("Gomez")**

Gomez was filed on March 30, 2012, and issued on June 20, 2017. Gomez qualifies as prior art to the '008 patent under at least 35 U.S.C. § 102(e) Gomez anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C11 provides representative, non-limiting examples of where Gomez discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Gomez does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Gomez alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Gomez with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**12. U.S. Patent No. 8,948,316 ("Currivan")**

Currivan was filed on March 23, 2012, issued on February 3, 2014, and claims priority to a Provisional Application No. 61/467,659 filed on March 25, 2011. Currivan qualifies as prior art to the '008 patent under at least 35 U.S.C. § 102(e). Currivan anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C12 provides representative, non-limiting examples of where Cavanagh discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Currivan does not anticipate any

Asserted Claim, such Asserted Claim would be obvious in view of Currivan alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Currivan with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**13. U.S. Patent No. 8,175,191 ("Tang")**

Tang was filed on February 20, 2008, and issued on May 8, 2012. Tang qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(e). Tang anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C13 provides representative, non-limiting examples of where Tang discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Tang does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Tang alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Tang with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**14. U.S. Patent No. 8,649,421 ("Renken")**

Renken was filed on February 17, 2012, issued on February 11, 2014, and claims priority to a provisional application filed on February 18, 2011. Renken qualifies as prior art to the '008 patent under at least 35 U.S.C. §§102(a) and 102(e). Renken anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted

Claims of the '008 patent. The claim chart attached as Exhibit C14 provides representative, non-limiting examples of where Renken discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Renken does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Renken alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Renken with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

## VI. STATE OF THE ART AND OBVIOUSNESS

The primary references identified above, as further described in the Exhibits, each discloses, either expressly or inherently, every element of the Asserted Claims of the identified Asserted Patent, thereby anticipating those claims. Additionally, each of the primary references alone (including in combination with the knowledge of a person of ordinary skill in the art) renders obvious such Asserted Claims. To the extent Plaintiff contends that any primary reference does not anticipate or render obvious the Asserted Claims as set forth above, it would have been obvious to combine or modify the primary references with concepts from other prior art, as explained throughout these Invalidity Contentions. In particular, for each limitation of the Asserted Claims that Plaintiff contends is not met by a particular primary reference, Defendants contend that the limitation (and claim as a whole) is obvious based on a combination of that particular primary reference with (1) any other primary reference disclosing that limitation, (2) any reference identified in Appendices A–C as disclosing that limitation, (3) any statements made in the intrinsic record of such Asserted Patent, and/or (4) the knowledge of one of ordinary skill in the art (as explained in additional detail below).

Defendants do not yet have the benefit of Plaintiff's positions regarding the prior art, including what element(s), if any, Plaintiff contends are not disclosed by each prior art reference, whether Plaintiff contends that a reference is not in fact prior art, and whether Plaintiff contends that a person of ordinary skill in the art would not be motivated to combine specific references. Defendants reserve the right to supplement these obviousness positions (including identifying additional prior art combinations and the associated reasons to combine) in view of such positions and/or as discovery in the case, including expert discovery, progresses.

The information discussed in the prior art raised in these Invalidity Contentions (including all referenced listed in the P.R. 3-3(a) – Identification of Prior Art) forms part of the background knowledge of a person of ordinary skill in the art at the time each of the Asserted Patents was filed and would have been used in determining whether and how to combine references to achieve the claimed invention(s), as discussed herein.[10] Indeed, the existence, nature, and content of each prior art reference, including the prior art references cited here, provide further evidence regarding the knowledge of a person of ordinary skill in the art at the relevant time. Defendants expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in these Invalidity Contentions, including to demonstrate that a particular claim element was known at the time of the Asserted Patents to a person of ordinary skill in the art, to show that the differences between a claimed invention and a prior art reference would have been obvious to a person of ordinary skill in the art, and to establish that a person of ordinary skill in the art would have been motivated to combine teachings of one or more references to achieve a claimed invention.

[10] *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that "the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious").

## A. General Motivations for Making Combinations of Prior Art

Defendants believe that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts; there was a reason to make each combination, each combination of art would have produced no unexpected results, and each combination at most would simply represent a known alternative to one of ordinary skill in the art. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 414–18 (2007) (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test instead espousing an "expansive and flexible" approach). Indeed, the Supreme Court held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like a pieces of a puzzle." *Id.* at 420–21.

Nevertheless, in keeping with the Local Patent Rules, in addition to the information contained elsewhere in these contentions, Defendants identify additional motivations and reasons to combine the cited art. A person of ordinary skill in the art would have been motivated to combine the primary and additional prior art references as set forth above and in Appendices A–C. Multiple teachings, suggestions, and/or reasons to modify any of the references and/or to combine any two or more of the references come from many sources, including the prior art (specific and as a whole), common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obvious to try, the nature of the problem faced, and/or knowledge possessed by one of ordinary skill in the art.[11] In addition, the patentee admits in the intrinsic record, including the specification and

[11] Defendants reserve the right to present qualified expert testimony on any or all of these items.

prosecution history of the Asserted Patents, that many of the claimed features were conventional and known in the art.

In general, a claimed invention is unpatentable if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a); *Graham v. John Deere Co.*, 383 U.S. 1, 13–14 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: "(1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." *Miles Labs., Inc. v. Shandon, Inc.*, 997 F.2d 870, 877 (Fed. Cir. 1993).

*KSR International Co. v. Teleflex Inc., et al.,* 550 U.S. 398 (2007) ("*KSR*"), reaffirmed *Graham*, holding that a claimed invention can be obvious even if there is no teaching, suggestion, or motivation for combining the prior art to produce that invention. In determining whether a claim is obvious, "[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id.* at 418. In determining whether a claim is obvious, "a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* When prior art elements are combined according to known methods to yield predictable results, the claimed invention is obvious. *Id.* at 417. In addition, "[o]ne of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of the invention a known problem for which there was an obvious solution

encompassed by the patent's claims." *Id.* at 419–20. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 420.

Any suggested obviousness combinations set forth herein are in the alternative to Defendants' anticipation contentions and are not to be construed to suggest that any reference included in any combination is not anticipatory in its own right or is not the basis for a single-reference obviousness defense. In particular, Defendants are currently unaware of the extent, if any, to which Plaintiff will contend that certain limitations of the Asserted Claims are not disclosed in the art identified by Defendants as anticipatory. To the extent that an issue arises with respect to any such claim limitation, Defendants reserve the right to identify other references and combinations, which may make obvious the allegedly missing limitation in the disclosed system or method.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362–64 (Fed. Cir. 2001).

In view of the Supreme Court's *KSR* decision, the PTO issued, and updated, a set of Examination Guidelines. *See* Examination Guidelines for Determining Obviousness Under 35 U.S.C. § 103 in view of the Supreme Court Decision in *KSR International Co. v. Teleflex, Inc.*, 72 Fed. Reg. 57526 (October 10, 2007); Examination Guidelines Update: Development in the Obviousness Inquiry After *KSR v. Teleflex*, 75 Fed. Reg. 53643-60 (September 2010); *see also* MPEP § 2141 (https://www.uspto.gov/web/offices/pac/mpep/s2141.html) (accessed July 6, 2022). These Guidelines summarized the *KSR* decision and subsequent case law, as well as identified

various rationales for finding a claim obvious, including those based on other precedents. Those rationales include:

(1) Combining prior art elements according to known methods to yield predictable results;

(2) Simple substitution of one known element for another to obtain predictable results;

(3) Use of known technique to improve similar devices (methods, or products) in the same way;

(4) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(5) "Obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(6) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; and

(7) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

Defendants contend that one or more of these rationales apply in considering the obviousness of the Asserted Claims of the Asserted Patents.

To the extent that prior art identified by Defendants as anticipatory are found not to anticipate the Asserted Claims: (1) the prior art establishes that the claimed subject matter was obvious to a person of ordinary skill in the art at the time of the alleged invention; (2) the claims are nevertheless unpatentable because the Asserted Claims contain nothing that goes beyond "ordinary innovation"; (3) no Asserted Claim goes beyond combining known elements to achieve predictable results (particularly in the predictable art(s) of the Asserted Patent) or does more than choose between clear alternatives known to those of skill in the art; and/or (4) the prior art renders the Asserted Claims obvious either alone or in combination with each other or one or more of the other references identified in these Invalidity Contentions.

Motivation to make the proposed combinations of prior art references and knowledge of one skilled in the art generally exists within the references themselves as well as within the knowledge of one skilled in the art in the relevant time frame. Below are exemplary specific motivations to combine references.

For example, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. Indeed, because each of these references are generally in the same field (*e.g.*, cable and/or satellite delivery systems) and/or are directed to solving the same alleged problems, including as set forth in the aforementioned claim charts, a person of ordinary skill in the art would be motivated to look for solutions in other references in that field or that solve the same alleged problems.

Relatedly, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry, and the desire to improve features and performance, would motivate the addition of features to systems as they become available, become smaller, become less expensive, become more commonly used, provide better performance, reduce costs, or predictably achieve other clearly desirable results.

Many of these prior art references cite to, rely upon, incorporate, or are described as an inherent part of one another, including as set forth in the aforementioned claim charts. To the extent such protocols or standards are not already considered inherent to or part of such references,

a person of ordinary skill in the art would be motivated to combine their teachings to achieve predictable results.

Certain of the aforementioned prior art references have the same prior art author(s). A person of ordinary skill in the art would be motivated to combine the work of the same prior art author. Similarly, certain of the prior art references involved the same firms or entities in their development, such as Hughes Network Systems or Hughes Electronics Company.

As shown in the attached Exhibits, each of the references identified comes from the same field. The problems sought to be solved by the identified references and systems were the same ones that had already been solved in the prior art. Indeed, the Asserted Claims recite one of a fine number of known, available alternatives to solve these known problems. The Asserted Claims simply combine previously known methods in a way that was explicitly and implicitly taught and suggested in the prior art. Implementing the teachings of the references identified herein would achieve improved performance.

The Asserted Claims are further obvious in view of the admitted prior art in the specification and file histories of the Asserted Patents. That is, the Asserted Patents themselves admit that certain features and claim elements were known in the prior art before the effective date of the Asserted Patents. Defendants reserve the right to rely on any admissions in the Asserted Patents as part of any obviousness combination, as part of the motivation to combine, and also to explain the state of the art at the time of the Asserted Patents.

**B. Specific Motivations for Making Combinations of Prior Art**

As explained above, Defendants contend that a person of ordinary skill in the art would have been motivated to combine any of the primary references in these Invalidity Contentions with (1) any other primary reference, (2) any reference disclosed in Appendices A–C as disclosing a limitation missing in a primary reference, (3) any statements made in the intrinsic record of the

Asserted Patents, and/or (4) the knowledge of one of ordinary skill in the art. By way of example only, Defendants provide the following exemplary combinations and some of the reasons a person of ordinary skill in the art would be motivated to combine references.

### 1. '576 Patent

#### a. Combinations Based on Ardemagni

To the extent Ardemagni does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Ardemagni with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| Basawapatna | • Ardemagni and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| U.S. Patent No. 6,970,717 ("Behrens") | • Ardemagni and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Behrens would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Ardemagni and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Ardemagni and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Ardemagni and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| International Published Patent Application No. WO 00/004704 ("Ellis") | • Ardemagni and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Ardemagni and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • Ardemagni and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Inose would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Ardemagni and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Ardemagni and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Ardemagni and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Ardemagni and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Ardemagni and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Ardemagni and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Ardemagni and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Ardemagni and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | receiver units with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Ardemagni and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| U.S. Patent No. 6,430,742 ("Chanteau") | • Ardemagni and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Ardemagni's system for distributing television and telecommunication services. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | • Combining Ardemagni and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| U.S. Patent No. 3,051,938 ("Levy") | • Ardemagni and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,359,447 ("Sage") | • Ardemagni and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Ardemagni and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,376,387 ("Eck") | • Ardemagni and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| U.S. Patent No. 5,724,091 ("Freeman") | • Ardemagni and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Freeman would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Japanese Published Unexamined Patent Application JP 2001/128138 ("Ishizaki") | • Ardemagni and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Japanese Published Unexamined Patent Application JP 2002/135745 ("Ogami") | • Ardemagni and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**b. Combinations Based on Basawapatna**

To the extent Basawapatna does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Basawapatna with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| Ardemagni | • Basawapatna and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Behrens | • Basawapatna and Behrens relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Basawapatna's system for distributing television and telecommunication services.<br><br>• Combining Basawapatna and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Basawapatna and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Basawapatna and Davis '055 relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Basawapatna and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Basawapatna and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Basawapatna and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| Inose | • Basawapatna and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Basawapatna and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| Kang | • Basawapatna and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Basawapatna and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Lovinggood would have been the application of known techniques (*e.g.*, digital processing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Basawapatna and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Basawapatna and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Basawapatna and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Basawapatna and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| Williams '873 | • Basawapatna and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Basawapatna and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Basawapatna and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Basawapatna and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Basawapatna and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Basawapatna and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Basawapatna and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Basawapatna and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Basawapatna and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Basawapatna's system for |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Basawapatna and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Basawapatna and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Basawapatna's system for distributing the broadband signal to a plurality of user devices. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | • Combining Basawapatna and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Basawapatna and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### c. Combinations Based on Carnero

To the extent Carnero does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Carnero with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| Ardemagni | • Carnero and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | • The combination of Carnero and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Carnero and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Carnero relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Processing selected transponder signals in the digital domain and converting the selected signal back to analog prior to combining would have been obvious in view of Carnero and Behrens and would have yielded predictable and desirable results of realizing resource-efficient digital processing while |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Carnero and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Behrens's digital processing of RF signals with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Carnero and Behrens would have been the application of known techniques to similar products/systems. |
| Chanteau | • Chanteau and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building).<br><br>• Combining the disclosures of Carnero and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Carnero and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Carnero and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Davis '055 and Carnero and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | • Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's digital processing of received transponder signals with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Carnero and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | • Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Carnero and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Carnero and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Carnero and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Carnero and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Gregoire and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Combining Gregoire and Carnero would have been the application of known techniques to similar products/systems. |
| Inose | • Carnero and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Carnero and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Carnero and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Carnero and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Lovinggood and Carnero and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Converting the selected signal back to analog prior to combining would have been obvious in view of Carnero and Lovinggood and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Lovinggood and Carnero would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Lovinggood's digital processing of received transponder signals with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Carnero would have been the application of known techniques to similar products/systems. |
| Mutzig | • Carnero and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to simultaneous reception of multiple TV channels retransmitted by satellites with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Mutzig would have been the application of known techniques (e.g., simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Oishi and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Carnero and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Carnero and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | • Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Carnero and Oishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Carnero and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Carnero and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Pugel '200 and Carnero and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | • Combining the disclosures of Pugel '200 and Carnero would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Pugel '200's digital processing of received transponder signals with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Carnero would have been the application of known techniques to similar products/systems. |
| Williams '419 | • Carnero and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Carnero and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**d. Combinations Based on Davis '055**

To the extent Davis '055 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Davis '055 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Ardemagni | • Davis '055 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis and Ardemagni with respect to distributing television and telecommunication services with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Basawapatna | • Davis '055 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Davis '055 relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Converting the selected signal to analog prior to combining would have been obvious in view of Davis '055 and Behrens and would have yielded predictable and desirable results of ensuring compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Davis '055 and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Davis '055 and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | • Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Carnero and Davis '055 and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's digital processing of received transponder signals to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems. |
| Chanteau | • Chanteau and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building).<br><br>• Combining the disclosures of Davis '055 and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Davis '055 and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Davis '055 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• Davis '730 and Davis '055 share a common inventor and original assignee. |
| Ellis | • Ellis and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Davis '055 and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Davis '055 and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Davis '055's LAN-based satellite antenna/satellite multiswitch to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Davis '055 and Ellis would have been the application of known techniques to similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Gregoire | • Gregoire and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Davis '055 and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Gregoire would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's digital processing of received transponder signals with Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Gregoire would have been the application of known techniques to similar products/systems.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '055 was originally assigned to Hughes. |
| Inose | • Davis '055 and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | • The combination of Davis '055 and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Davis '055 and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Davis '055 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to its system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable system with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Davis '055 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to its digital processing of received transponder signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | ODU would have been obvious in view of Davis '055 and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Mutzig would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Davis '055 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Oishi | • Oishi and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Davis '055 and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Davis '055 and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Davis '055's LAN-based satellite antenna/satellite multiswitch to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Davis '055 and Oishi would have been the application of known techniques to similar products/systems. |
| Pugel '200 | • Davis '055 and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Davis '055 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Williams '419 would have been the application of known techniques (*e.g.*, to distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Williams '873 | • Davis '055 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Davis '055's system for connecting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Williams '873 would have been the application of known techniques (*e.g.*, to distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '055 share a common original assignee. |

**e. Combinations Based on Davis '730**

To the extent Davis '730 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Davis '730 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Ardemagni | • Davis '730 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Basawapatna | • Davis '730 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Davis '730 and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Davis '730 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Davis '730 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Davis '730 and Davis '055 share a common inventor and original assignee. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Ellis | • Davis '730 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Davis '730 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '730 was originally assigned to Hughes. |
| Inose | • Davis '730 and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Davis '730 and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Davis '730's system for distributing multiple satellite signals over a single cable line. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • Combining Davis '730 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results.<br><br>• Davis '730 and James would be obvious to combine because both share a common assignee. |
| Kang | • Davis '730 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Davis '730 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Davis '730 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Davis '730 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | respect to combining signals from the ODU to be transmitted by a single cable with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Davis '730 and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Davis '730 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | receiver units with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '730 share a common original assignee. |
| Williams '873 | • Davis '730 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Williams '873 and Davis '730 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '730 share a common original assignee. |
| Gurantz | • Davis '730 and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Davis '730 and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Davis '730 and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Davis '730 and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Davis '730's system for distributing multiple satellite signals over a single cable line. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • Combining Davis '730 and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Davis '730 and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Davis '730 and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Davis '730 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Eck | • Davis '730 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Davis '730 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Davis '730 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Davis '730 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**f. Combinations Based on Gregoire**

To the extent Gregoire does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated

to combine Gregoire with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Ardemagni | • Gregoire and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Gregoire and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Basawapatna would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Behrens | • Behrens and Gregoire relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Processing selected transponder signals in the digital domain and converting the selected signal back to analog prior to combining would have been obvious in view of Gregoire and Behrens and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Gregoire and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Behrens's digital processing of RF signals with Gregoire's system for distribution of direct-to-home wireless services (such as satellite television) to more efficiently provide those services to a plurality of users requesting various transponder signals.<br><br>• Combining Gregoire and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Gregoire and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Gregoire's system for distribution of direct-to-home wireless services. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • Combining Gregoire and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Chanteau | • Chanteau and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building).<br><br>• Combining the disclosures of Gregoire and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Gregoire and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Gregoire and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Davis '055 and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Gregoire would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's digital processing of received transponder signals with Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Gregoire would have been the application of known techniques to similar products/systems.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '055 was originally assigned to Hughes. |
| Davis '730 | • Gregoire and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '730 was originally assigned to Hughes. |
| Ellis | • Ellis and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Gregoire and Ellis and would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Gregoire and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Gregoire's system for distribution of direct-to-home wireless services to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Gregoire and Ellis would have been the application of known techniques to similar products/systems. |
| Inose | • Gregoire and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Gregoire and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Gregoire and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Gregoire and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Lovinggood and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Converting the selected signal back to analog prior to combining would have been obvious in view of Gregoire and Lovinggood and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Lovinggood and Gregoire would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Lovinggood's digital processing of received transponder signals with Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Carnero would have been the application of known techniques to similar products/systems. |
| Mutzig | • Gregoire and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Mutzig would have been the application of known techniques (*e.g.*, the simultaneous |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Gregoire and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Oishi | • Oishi and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Gregoire and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Gregoire and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Gregoire's system for distribution of direct-to-home wireless |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | services to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Gregoire and Oishi would have been the application of known techniques to similar products/systems. |
| Pugel '200 | • Gregoire and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Pugel '200 and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Gregoire would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Pugel '200's digital processing of received transponder signals with Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Gregoire would have been the application of known techniques to similar products/systems. |
| Williams '419 | • Gregoire and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '419 was originally assigned to Hughes. |
| Williams '873 | • Gregoire and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '873 was originally assigned to Hughes. |

### g. Combinations Based on Inose

To the extent Inose does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to

combine Inose with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| Ardemagni | • Inose and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Inose and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| Behrens | • Inose and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Inose and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Inose and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Inose and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Inose and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | • The combination of Inose and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Inose and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| James | • Inose and James relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Inose and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Inose and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Inose and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Inose and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Inose and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Inose and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | • The combination of Inose and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Inose and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Inose and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Inose and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Inose and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Inose and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Inose's system for distributing digital broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | • Combining Inose and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Inose and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Inose and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Inose and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Inose and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Inose and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Inose and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Inose and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### h. Combinations Based on James

To the extent James does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine James with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| Ardemagni | • James and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • James and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • James and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • James and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • James and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • James and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• James and Davis '830 would be obvious to combine because both share a common assignee. |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| Ellis | • James and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • James and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • James and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| Kang | • James and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • James and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • James and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Mutzig would have been the application of known techniques (*e.g.*, simultaneous |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • James and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • James and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • James and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• James and Williams '419 would be obvious to combine because both share a common assignee. |
| Williams '873 | • James and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable. |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | • Combining James and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• James and Williams '873 would be obvious to combine because both share a common assignee. |
| Gurantz | • James and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • James and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with James's |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • James and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of James and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • James and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of James and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| Oishi | • James and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • James and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • James and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | • The combination of James and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • James and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • James and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | • The combination of James and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**i. Combinations Based on Kang**

To the extent Kang does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Kang with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Ardemagni | • Kang and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | • Combining Kang and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Kang and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Kang and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Behrens would have been the application of known techniques (*e.g.*, digital processing of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | RF signals) to known products/systems to yield predictable results. |
| Carnero | • Kang and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Kang and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | • Combining Kang and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Kang and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Kang and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | • Combining Kang and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Kang and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • Kang and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Kang's system for |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Kang and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Lovinggood | • Kang and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | with respect to digital processing of received transponder signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Kang and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Kang and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Kang and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Kang and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Kang and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Kang and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Kang and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Kang and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | digital signals to analog signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Kang and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Kang and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to frequency-shifting the signals to a vacant frequency band with Kang's system for receiving and distributing satellite |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Oishi would have been the application of known techniques (*e.g.*, frequency-shifting the signals to a vacant frequency band) to known products/systems to yield predictable results. |
| Eck | • Kang and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Kang and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Kang's system for receiving and distributing satellite broadcasting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Kang and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Kang and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | rooms via a coaxial cable with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**j. Combinations Based on Lovinggood**

To the extent Lovinggood does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Lovinggood with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| Ardemagni | • Lovinggood and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Lovinggood and Basawapatna relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Converting the selected signal to analog prior to combining would have been obvious in view of Lovinggood and Behrens and would have yielded predictable and desirable results of ensuring compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Lovinggood and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Lovinggood and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Carnero and Lovinggood and would have yielded predictable and desirable results of reducing the number of components |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Lovinggood and Carnero would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Lovinggood's digital processing of received transponder signals to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Carnero would have been the application of known techniques to similar products/systems. |
| Chanteau | • Chanteau and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Combining the disclosures of Lovinggood and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Lovinggood and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Lovinggood and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | satellite antenna via a local area network with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Lovinggood and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Combining the disclosures of Lovinggood and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Combining Lovinggood and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Gregoire and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | • Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Lovinggood and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Lovinggood and Gregoire would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Lovinggood's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Carnero would have been the application of known techniques to similar products/systems. |
| Inose | • Lovinggood and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals with James's system for receiving |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | broadband signals) to known products/systems to yield predictable results. |
| James | • Lovinggood and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Lovinggood and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | cable) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Lovinggood and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Lovinggood and Mutzig would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Lovinggood's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Mutzig would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Lovinggood and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | by a single cable with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Lovinggood and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Oishi | • Oishi and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Combining the disclosures of Lovinggood and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Combining Lovinggood and Oishi would have been the application of known techniques to similar products/systems. |
| Williams '419 | • Lovinggood and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | • The combination of Lovinggood and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Lovinggood and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**k. Combinations Based on Mutzig**

To the extent Mutzig does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Mutzig with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| Ardemagni | • Mutzig and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Mutzig and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Mutzig relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | • Processing selected transponder signals in the digital domain and converting the selected signal back to analog prior to combining would have been obvious in view of Mutzig and Behrens and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Mutzig and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Behrens's digital processing of RF signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently provide those channels to a plurality of users requesting various transponder signals.<br><br>• Combining Mutzig and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Mutzig and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Chanteau | • Chanteau and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building).<br><br>• Combining the disclosures of Mutzig and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Mutzig and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Mutzig and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Davis '055 and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's digital processing of received transponder signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | • Combining Davis '055 and Mutzig would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Mutzig and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Mutzig and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Mutzig and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Mutzig and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Gregoire and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Gregoire and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Combining Gregoire and Mutzig would have been the application of known techniques to similar products/systems. |
| Inose | • Mutzig and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Mutzig and James relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Mutzig and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| Lovinggood | • Mutzig and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Lovinggood and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Converting the selected signal back to analog prior to combining would have been obvious in view of Mutzig and Lovinggood and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Lovinggood and Mutzig would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Lovinggood's digital processing of received transponder signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Mutzig would have been the application of known techniques to similar products/systems. |
| Oishi | • Oishi and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | • Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Mutzig and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Mutzig and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Mutzig and Oishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Mutzig and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Mutzig and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Pugel '200 and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Mutzig would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Pugel '200's digital processing of received transponder signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Mutzig would have been the application of known techniques to similar products/systems. |
| Williams '419 | • Mutzig and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | • Combining Mutzig and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Mutzig and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

### l. Combinations Based on Petruzzelli

To the extent Petruzzelli does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Petruzzelli with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| Ardemagni | • Petruzzelli and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ardemagni would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Petruzzelli and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Petruzzelli and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | respect to digital processing of RF signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Petruzzelli and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Petruzzelli and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Petruzzelli and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Petruzzelli and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Petruzzelli and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • Petruzzelli and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Petruzzelli and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Petruzzelli and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Petruzzelli and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Petruzzelli and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Pugel '200 | • Petruzzelli and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Petruzzelli and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | with respect to distributing broadband signals to multiple receiver units with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Petruzzelli and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Petruzzelli and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | boxes with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Petruzzelli and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Petruzzelli and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Petruzzelli and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Levy would have been the application of known techniques (*e.g.*, converting digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Petruzzelli and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Petruzzelli and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Petruzzelli and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Petruzzelli and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Petruzzelli and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Petruzzelli and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | • The combination of Petruzzelli and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Petruzzelli and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**m. Combinations Based on Pugel '200**

To the extent Pugel '200 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated

to combine Pugel '200 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| Ardemagni | • Pugel '200 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Pugel '200 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| Behrens | • Behrens and Pugel '200 relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Converting the selected signal to analog prior to combining would have been obvious in view of Pugel '200 and Behrens and would have yielded predictable and desirable results of ensuring compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Pugel '200 and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Pugel '200 and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Pugel '200 and Carnero and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Carnero would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Pugel '200's digital processing of received transponder signals to more efficiently provide satellite television services to a plurality of users requesting various transponder signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | • Combining Pugel '200 and Carnero would have been the application of known techniques to similar products/systems. |
| Chanteau | • Chanteau and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Combining the disclosures of Pugel '200 and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Pugel '200 and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Pugel '200 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Davis '055 would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Davis '730 | • Pugel '200 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Mutzig relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Pugel '200 and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Pugel '200 and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Pugel '200's method and apparatus for simultaneously processing carrier signals (including in satellite communications systems) to more efficiently provide satellite services to facilitate user selection of and access to satellite services.<br><br>• Combining Pugel '200 and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Gregoire and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | ODU would have been obvious in view of Pugel '200 and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Gregoire would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Pugel '200's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Gregoire would have been the application of known techniques to similar products/systems. |
| Inose | • Pugel '200 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| James | • Pugel '200 and James relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Pugel '200 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Pugel '200 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Pugel '200 and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Mutzig would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Pugel '200's digital processing of received transponder signals, to more efficiently provide satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Mutzig would have been the application of known techniques to similar products/systems. |
| Oishi | • Oishi and Mutzig relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Pugel '200 and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Pugel '200 and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Pugel '200's method and apparatus for simultaneously processing carrier signals (including in satellite communications systems) to more efficiently provide satellite services to facilitate user selection of and access to satellite services.<br><br>• Combining Pugel '200 and Oishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Pugel '200 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Williams '419 | • Pugel '200 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Pugel '200 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Pugel '200's system for digital processing of received transponder signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | • Combining Pugel '200 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**n. Combinations Based on Williams '419**

To the extent Williams '419 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Williams '419 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Ardemagni | • Williams '419 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Williams '419 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Williams '419 and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Williams '419 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | satellite television services to a plurality of users requesting various transponder signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Williams '419 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Davis '730 | • Williams '419 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '730 share a common original assignee. |
| Ellis | • Williams '419 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Williams '419 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '419 was originally assigned to Hughes. |
| Inose | • Williams '419 and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Williams '419 and James relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Williams '419 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | cable) to known products/systems to yield predictable results. |
| Lovinggood | • Williams '419 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Williams '419 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Williams '419 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Williams '419 and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Williams '873 | • Williams '419 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Williams '419's system for the same.<br><br>• Combining Williams '419 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Williams '419 share a common inventor and original assignee. |
| Gurantz | • Williams '419 and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Chanteau | • Williams '419 and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Williams '419 and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Williams '419 and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • The combination of Williams '419 and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Williams '419 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Williams '419 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | been motivated to combine the disclosure of Eck with respect to storing a translation table with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Williams '419 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Williams '419 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Williams '419's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • Combining Williams '419 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Williams '419 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### o. Combinations Based on Williams '873

To the extent Williams '873 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Williams '873 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| Ardemagni | • Williams '873 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • The combination of Williams '873 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Williams '873 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Williams '873 and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Williams '873 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Williams '873 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '055 share a common original assignee. |
| Davis '730 | • Williams '873 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '730 share a common original assignee. |
| Ellis | • Williams '873 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ellis would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Williams '873 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '873 was originally assigned to Hughes. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| Inose | • Williams '873 and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Williams '873 and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • Williams '873 and James would be obvious to combine because both share a common assignee. |
| Kang | • Williams '873 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Williams '873 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Williams '873's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • Combining Williams '873 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Williams '873 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Williams '873 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Williams '873's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • Combining Williams '873 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Williams '873 and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Williams '873 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Williams '873's system for the same.<br><br>• Combining Williams '873 and Williams '419 would have been the application of known techniques (*e.g.*, distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Williams '419 share a common inventor and original assignee. |
| Gurantz | • Williams '873 and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Williams '873 and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Chanteau would have been the application of known techniques (*e.g.*, broadcasting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | digital data channels) to known products/systems to yield predictable results. |
| Levy | • Williams '873 and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Williams '873 and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Williams '873 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • The combination of Williams '873 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Williams '873 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Williams '873 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Williams '873 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Williams '873 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | multiple rooms via a coaxial cable with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### 2. '715 Patent

#### a. Combinations Based on Ardemagni

To the extent Ardemagni does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Ardemagni with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| Carnero | • Ardemagni and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Ardemagni and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Ardemagni and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Ardemagni and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Ardemagni's system for receiving broadband signals at an ODU and distributing it to IRDs.<br><br>• Combining Ardemagni and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Ardemagni and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Fisk would have been the application of known techniques (*e.g.*, system and method of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Ardemagni and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Ardemagni and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Ardemagni's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Ardemagni and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Ardemagni and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
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| | reception of multiple TV channels retransmitted by satellites with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Ardemagni and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Oishi would have been the application of known techniques (*e.g.*, frequency-shifting the signals to a vacant frequency band) to known products/systems to yield predictable results. |
| Petruzzelli | • Ardemagni and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | signals from the ODU with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Ardemagni and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Ardemagni and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Freeman | • Ardemagni and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,099,951 ("Laksono '951") | • Ardemagni and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Ardemagni's system for distributing television and telecommunication services. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | • Combining Ardemagni and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,200,855 ("Laksono '855") | • Ardemagni and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,301,900 ("Laksono '900") | • Ardemagni and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| Eck | • Ardemagni and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| International Published Patent Application No. WO 01/005156 ("Eames") | • Ardemagni and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Ardemagni and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Ardemagni and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |
| TR 101 201 V1.1.1 (1997-10) - "Digital Video | • Ardemagni and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| Broadcasting (DVB); Interaction channel for Satellite Master Antenna TV (SMATV) distribution systems; Guidelines for versions based on satellite and coaxial sections ("TR 101 201 V1.1.1") | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• Ardemagni explains that its "invention relates to a system of the above mentioned kind that enables the already existing facilities designed for centralized distribution of land based television channels, also known as Master Antenna TV (MATV) to be adapted, in economically convenient and reliable way," and TR 101 201 V1.1.1 is a document describing the MATV standard for satellites. |

**b. Combinations Based on Carnero**

To the extent Carnero does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Carnero with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| Ardemagni | • Carnero and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| Davis '055 | • Carnero and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's interface device Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Carnero's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Carnero and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals ) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| Ellis | • Ellis and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Carnero and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Carnero and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Carnero and Ellis would have been the application of known techniques to similar products/systems. |
| Fisk | • Carnero and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Fisk's server with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Carnero's composite signal to a plurality of devices over a digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Fisk and Carnero would have been the application of known techniques to similar products/systems. |
| Gregoire | • Carnero and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distribution of direct-to-home wireless services with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Gregoire would have been the application of known techniques (*e.g.*, distribution of direct-to-home wireless services) to known products/systems to yield predictable results. |
| Hicks | • Carnero and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Hicks's gateway with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | of Carnero's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Hicks and Carnero would have been the application of known techniques to similar products/systems. |
| Kang | • Carnero and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Carnero and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to simultaneous reception of multiple TV channels retransmitted by satellites with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| U.S. Patent No. 6,480,551 ("Ohishi") | • Ohishi and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (*e.g.*, a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Carnero and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Carnero and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information table) with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Carnero and Oishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Carnero and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Carnero and Williams '419 to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Carnero and Williams '873 to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | broadband signals to multiple receiver units with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**c. Combinations Based on Davis '055**

To the extent Davis '055 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Davis '055 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Ardemagni | • Ardemagni and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Ardemagni would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ardemagni's system for distributing television and telecommunication services from a peripheral node to user terminals, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's interface device to provide a single, aggregated signal for distribution by Davis '055's interface device.<br><br>• Combining Davis '055 and Ardemagni would have been the application of known techniques to similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Carnero | • Carnero and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's interface device, to provide a single, aggregated signal for distribution by Davis '055's interface device.<br><br>• Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Davis '055 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals ) to known products/systems to yield predictable results.<br><br>• Davis '730 and Davis '055 share a common inventor and original assignee. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Fisk | • Davis '055 and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to with respect to its system and method of distributing television, video and other signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Fisk would have been the application of known techniques (*e.g.*, distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Davis '055 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distribution of direct-to-home wireless services with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Gregoire would have been the application of known techniques (*e.g.*, respect to distribution of direct-to-home wireless services) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | • Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '055 was originally assigned to Hughes. |
| Hicks | • Davis '055 and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to its digital residential entertainment system with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Hicks would have been the application of known techniques (*e.g.*, digital residential entertainment system) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Ellis and Davis '055 and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Davis '055 and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | with Davis '055's LAN-based satellite antenna/satellite multiswitch to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Davis '055 and Ellis would have been the application of known techniques to similar products/systems. |
| Kang | • Davis '055 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to its system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | delivering the requested transponders on a composite signal, with Davis '055's interface device to provide a single, aggregated signal for distribution by Davis '055's interface device.<br><br>• Combining Davis '055 and Mutzig would have been the application of known techniques to similar products/systems. |
| Ohishi | • Ohishi and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Davis '055 and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Davis '055 and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Davis '055's LAN-based satellite antenna/satellite multiswitch to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Fisk and Ohishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Davis '055 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Davis '055 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Williams '419 would have been the application of known techniques (*e.g.*, to distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Williams '873 | • Davis '055 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Williams '873 would have been the application of known techniques (*e.g.*, to distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '055 share a common original assignee. |

**d. Combinations Based on Davis '730**

To the extent Davis '730 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Davis '730 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Ardemagni | • Davis '730 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Davis '730 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Davis '730 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Davis '730's system for distributing multiple satellite signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • Combining Davis '730 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Davis '730 and Davis '055 share a common inventor and original assignee. |
| Ellis | • Davis '730 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Davis '730 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Davis '730 and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | distributing television, video and other signals with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Davis '730 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '730 was originally assigned to Hughes. |
| Hicks | • Davis '730 and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Davis '730 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Davis '730 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Davis '730 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Petruzzelli | • Davis '730 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Davis '730 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '730 share a common original assignee. |
| Williams '873 | • Davis '730 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Davis '730's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Davis '730 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '730 share a common original assignee. |
| Freeman | • Davis '730 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Davis '730 and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Davis '730 and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Davis '730 and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Davis '730 and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Davis '730 and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Davis '730 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Davis '730 and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | signals to a gateway device with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Davis '730 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Davis '730 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**e. Combinations Based on Fisk**

To the extent Fisk does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Fisk with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| Ardemagni | • Ardemagni and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Ardemagni would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ardemagni's system for distributing television and telecommunication services from a peripheral node to user terminals, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Fisk's server, to provide a single, aggregated signal for distribution by Fisk's server.<br><br>• Combining Fisk and Ardemagni would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Fisk's server, to provide a single, aggregated signal for distribution by Fisk's server.<br><br>• Combining Fisk and Carnero would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Fisk and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Fisk and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | • The combination of Fisk and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Ellis and Fisk and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Fisk and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Fisk's system and method of distributing television, video and other signals to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Fisk and Ellis would have been the application of known techniques to similar products/systems. |
| Hicks | • Fisk and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Hicks would have been the application of known techniques (*e.g.*, a gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Fisk and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to distributing multiple satellite signals with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Fisk's server to provide a single, aggregated signal for distribution by Fisk's server.<br><br>• Combining Fisk and Mutzig would have been the application of known techniques to similar products/systems. |
| Oishi | • Fisk and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Ohishi | • Ohishi and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Fisk and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Fisk and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Fisk's system and method of distributing television, video and other signals to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Fisk and Ohishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Fisk and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Petruzzelli would have been the application of known techniques (*e.g.*, with respect to combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Fisk and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | • The combination of Fisk and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Fisk and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**f. Combinations Based on Gregoire**

To the extent Gregoire does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated

to combine Gregoire with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Ardemagni | • Gregoire and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Davis '055 | • Gregoire and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's interface device with Gregoire's system for distribution of direct-to-home wireless services, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Gregoire's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '055 was originally assigned to Hughes. |
| Davis '730 | • Gregoire and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '730 was originally assigned to Hughes. |
| Ellis | • Ellis and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Gregoire and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • Combining the disclosures of Gregoire and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Gregoire's system for distribution of direct-to-home wireless services to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Gregoire and Ellis would have been the application of known techniques to similar products/systems. |
| Fisk | • Gregoire and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Gregoire would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Fisk's server with Gregoire's system for distribution of direct-to-home wireless services, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Gregoire's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Fisk and Gregoire would have been the application of known techniques to similar products/systems. |
| Hicks | • Gregoire and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • Combining the disclosures of Hicks and Gregoire would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Hicks's gateway with Gregoire's system for distribution of direct-to-home wireless services, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Gregoire's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Hicks and Gregoire would have been the application of known techniques to similar products/systems. |
| Kang | • Gregoire and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Gregoire and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • The combination of Gregoire and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Mutzig would have been the application of known techniques (*e.g.*, the simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Ohishi | • Ohishi and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Gregoire and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Gregoire and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Gregoire's system for distribution of direct-to-home wireless services to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Gregoire and Oishi would have been the application of known techniques to similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Petruzzelli | • Gregoire and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Gregoire and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '419 was originally assigned to Hughes. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Williams '873 | • Gregoire and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '873 was originally assigned to Hughes. |
| TR 101 201 V1.1.1 (1997-10) - "Digital Video Broadcasting (DVB); Interaction channel for Satellite Master Antenna TV (SMATV) distribution systems; Guidelines for versions based on satellite and coaxial sections ("TR 101 201 V1.1.1") | • Gregoire and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

**g. Combinations Based on Hicks**

To the extent Hicks does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Hicks with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| Ardemagni | • Ardemagni and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Ardemagni would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ardemagni's system for distributing television and telecommunication services from a peripheral node to user terminals, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Hicks's gateway, to provide a single, aggregated signal for distribution by Hicks's gateway.<br><br>• Combining Fisk and Ardemagni would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Hicks's gateway, to provide a single, aggregated signal for distribution by Hicks's gateway.<br><br>• Combining Hicks and Carnero would have been the application of known techniques to similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| Davis '055 | • Hicks and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Hicks and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Hicks relate to the same and/or related field because both relate to distributing multimedia to and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Ellis and Hicks and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Hicks and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Hicks's digital residential entertainment system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Hicks and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Hicks and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Hicks's system including a gateway to provide a single, aggregated signal for distribution. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | • Combining Hicks and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Kang | • Hicks and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | delivering the requested transponders on a composite signal, with Hicks's gateway to provide a single, aggregated signal for distribution by Hicks's gateway.<br><br>• Combining Hicks and Mutzig would have been the application of known techniques to similar products/systems. |
| Oishi | • Hicks and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Ohishi | • Ohishi and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Hicks and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Hicks and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | • Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Hicks's digital residential entertainment system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Hicks and Ohishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Hicks and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Hicks and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Hicks's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Hicks and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**h. Combinations Based on Kang**

To the extent Kang does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Kang with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Ardemagni | • Kang and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Kang and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Davis '055 | • Kang and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Kang and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Ellis | • Kang and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Kang and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Kang and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Kang and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Kang and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Kang's system |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Mutzig | • Kang and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Kang and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | table with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Petruzzelli | • Kang and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Kang and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Kang's system for receiving and distributing satellite broadcasting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Kang and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Freeman | • Kang and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Kang's system for receiving |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Kang and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Kang and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | • Combining Kang and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Kang and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Kang and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | • Combining Kang and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Kang and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Kang's system for distributing television and telecommunication services.<br><br>• Combining Kang and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Kang and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Ishizaki would have been the application of known techniques (*e.g.*, distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Kang and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |
| TR 101 201 V1.1.1 | • Kang and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• Kang explains that its "[i]n general, the Satellite Master Antenna Television (hereinafter abbreviated as "SMATV") is a system that receives satellite broadcasts through a central antenna used jointly and distributes them to public service areas (e.g., apartments, hotels, hospitals, etc.)," and TR 101 201 V1.1.1 is a document describing the SMATV standard. |

### i. Combinations Based on Mutzig

To the extent Mutzig does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Mutzig with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| Ardemagni | • Mutzig and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Davis '055 | • Mutzig and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's interface device with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Mutzig's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Davis '055 and Mutzig would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Mutzig and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Ellis and Mutzig and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | • Combining the disclosures of Mutzig and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Mutzig and Ellis would have been the application of known techniques to similar products/systems. |
| Fisk | • Mutzig and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Fisk's server with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Mutzig's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Fisk and Mutzig would have been the application of known techniques to similar products/systems. |
| Gregoire | • Mutzig and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Gregoire would have yielded predictable and desirable results of receiving, selecting, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Hicks and Mutzig relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Hicks's gateway with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Mutzig's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Hicks and Gregoire would have been the application of known techniques to similar products/systems. |
| Kang | • Mutzig and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Oishi | • Mutzig and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Ohishi | • Ohishi and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Mutzig and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Mutzig and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Mutzig and Ohishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Mutzig and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Mutzig and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Mutzig and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

### j. Combinations Based on Oishi

To the extent Oishi does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Oishi with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| Ardemagni | • Oishi and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Oishi and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | of users requesting various transponder signals with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Davis '055 | • Oishi and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Oishi and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | multiple satellite signals with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Oishi and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Oishi and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Oishi's system for providing a frequency conversion table.<br><br>• Combining Petruzzelli and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Oishi and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Oishi's system for providing a frequency conversion table. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | • Combining Oishi and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Oishi and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Oishi and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | single, aggregated signal for distribution with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Oishi and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Oishi and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | with Oishi's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Oishi and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Oishi and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Oishi and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | broadband signals to multiple receiver units with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Oishi and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Freeman | • Oishi and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Oishi's system for providing a frequency conversion table. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | • Combining Oishi and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Oishi and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Oishi and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Oishi and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Oishi and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| Laksono '900 | • Oishi and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Oishi and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Oishi and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Oishi and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | • The combination of Oishi and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Oishi and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Oishi and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Ogami would have yielded predictable and desirable results of receiving, selecting, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**k. Combinations Based on Petruzzelli**

To the extent Petruzzelli does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Petruzzelli with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| Ardemagni | • Petruzzelli and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Ardemagni would have been the application of known techniques (*e.g.*, distributing television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Petruzzelli and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Davis '055 | • Petruzzelli and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | network) to known products/systems to yield predictable results. |
| Davis '730 | • Petruzzelli and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Petruzzelli and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| Fisk | • Petruzzelli and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Petruzzelli and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Petruzzelli and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Petruzzelli and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Petruzzelli and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Petruzzelli and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Oishi would have been the application of known techniques (*e.g.*, the frequency |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | conversion table) to known products/systems to yield predictable results. |
| Williams '419 | • Petruzzelli and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Petruzzelli and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| Freeman | • Petruzzelli and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Petruzzelli and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Petruzzelli and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Petruzzelli and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | • The combination of Petruzzelli and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Petruzzelli and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Petruzzelli and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Petruzzelli and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Petruzzelli and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Petruzzelli and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | channel with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Petruzzelli and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### l. Combinations Based on Williams '419

To the extent Williams '419 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Williams '419 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Ardemagni | • Williams '419 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Williams '419 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Davis '055 | • Williams '419 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Davis '730 | • Williams '419 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Davis '730 would have been the application of known techniques (*e.g.*, distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | multiple satellite signals) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Ellis | • Williams '419 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Williams '419 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Williams '419 and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Williams '419's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • Combining Williams '419 and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Williams '419 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '419 was originally assigned to Hughes. |
| Hicks | • Williams '419 and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Williams '419 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Williams '419 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Mutzig would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Williams '419 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Petruzzelli | • Williams '419 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '873 | • Williams '419 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Williams '419's system for the same.<br><br>• Combining Williams '419 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Williams '419 share a common inventor and original assignee. |
| Freeman | • Williams '419 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Williams '419 and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Williams '419 and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Williams '419 and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Williams '419 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Williams '419's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • Combining Williams '419 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Williams '419 and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Williams '419 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | channel) to known products/systems to yield predictable results. |
| Ogami | • Williams '419 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |
| TR 101 201 V1.1.1 | • Williams '419 and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• Williams '419 recognizes the SMATV standard as a proposed system to resolve problems in the art, and TR 101 201 V1.1.1 is a document describing the SMATV standard. |

### m. Combinations Based on Williams '873

To the extent Williams '873 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been

motivated to combine Williams '873 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| Ardemagni | • Williams '873 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Williams '873 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Carnero would have been the application of known techniques (*e.g.*, distributing the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Davis '055 | • Williams '873 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '055 share a common original assignee. |
| Davis '730 | • Williams '873 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Williams '873's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • Combining Williams '873 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '730 share a common original assignee. |
| Ellis | • Williams '873 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Williams '873 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Williams '873 and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Williams '873 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '873 was originally assigned to Hughes. |
| Hicks | • Williams '873 and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • The combination of Williams '873 and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Williams '873 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Williams '873 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Williams '873 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Petruzzelli | • Williams '873 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Williams '873 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Williams '873's system for the same.<br><br>• Combining Williams '873 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Williams '419 share a common inventor and original assignee. |
| Freeman | • Williams '873 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Williams '873 and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Williams '873 and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Laksono '855 would have yielded predictable and desirable results of processing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Williams '873 and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Williams '873 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | the disclosure of Eck with respect to storing a translation table with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Williams '873 and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Williams '873 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | channel with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Williams '873 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |
| TR 101 201 V1.1.1 | • Williams '873 and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• Williams '873 recognizes the SMATV standard as a proposed system to resolve problems in the art, and TR 101 201 V1.1.1 is a document describing the SMATV standard. |

### 3. '008 Patent

#### a. Combinations Based on Coyne

To the extent Coyne does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Coyne with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| Maycock | • Coyne and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Coyne and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Coyne and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Coyne and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Coyne and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Coyne and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | spectrum with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Coyne and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Coyne and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Coyne and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Coyne and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with Coyne's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | • Combining Coyne and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Coyne and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Coyne and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Coyne's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | • Combining Coyne and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| U.S. Patent No. 8,352,995 (Filed Jan. 7, 2011, Issued Jan. 8, 2013) ("Sadja") | • Coyne and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| U.S. Patent No. 8,494,091 (Filed May 30, 2012, claiming priority to Mar. 28, 2007, Issued Jul. 23, 2013) ("Yu") | • Coyne and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Coyne and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| U.S. Patent Publication No. 2011/0176060 (Filed Mar. 2, 2010, Published July 21, 2011) ("Lee") | • Coyne and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| BCM4528 Chip (Available, known, and/or sold on or before Sep. 6, 2011) ("BCM4528 Announcement") | • Coyne and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Coyne and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Coyne's system for receiving and analyzing signals.<br><br>• Combining Coyne and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**b. Combinations Based on Maycock**

To the extent Maycock does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Maycock with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| Petrovic | • Maycock and Petrovic relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Maycock and Petrovic relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Petrovic and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | disclosures of Petrovic and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Maycock and Coyne relate to the same and/or related field because both relate to signal processing and analysis and specifically both disclose satellite systems. Additionally, both Maycock and Coyne relate to monitoring and analysis of received content, including satellite transmitted content. For example, it would have been obvious to combine the techniques disclosed in Coyne for satellite communications with Maycock because Maycock discloses satellite TV systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Coyne and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Coyne and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Coyne would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Maycock and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Flask would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Maycock and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Caporizzo would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Maycock and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Maycock and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Full Band Capture Chip System | • Maycock and the Full Band Capture Chip System relate to the same and/or related fields of processing television transmissions. Both Maycock and the Full Band Capture Chip System disclose cable TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the Full Band Capture Chip System with Maycock because Maycock also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Maycock would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | received spectrum of a television signal, such as the ones disclosed in Maycock. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously. |
| Cavanagh | • Cavanagh and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Maycock and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | • Combining Maycock and ITU would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable result |
| DVB | • Maycock and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and DVB would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Maycock and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | • Combining Maycock and Gomez would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Currivan | • Maycock and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Maycock and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Maycock and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Currivan would have been the application of known techniques (e.g., analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Tang | • Maycock and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Maycock and Currivan relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and Maycock to capture, channelize, analyze and report on the full spectrum of received content |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Maycock relating to analysis/monitoring and display of received television signals. |
| BCM4528 | • Maycock and the BCM4528 chip relate to the same and/or related fields of processing television transmissions. Both Maycock and the BCM4528 chip disclose satellite TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the BCM4528 chip with Maycock because Maycock also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the BCM4528 chip and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of the BCM4528 chip and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Maycock would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the BCM4528 chip.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Maycock. Full band capture allowed for advantages such as quicker channel switching and display, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining Maycock and the BCM4528 would have been the application of known techniques (e.g., analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Sadja | • Maycock and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and channelizing with Sadja's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Maycock and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Maycock's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | • Combining Maycock and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Maycock and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Maycock's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Lee | • Maycock and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality and adjusting based on the analysis with Maycock's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Lee would have been the application of known techniques (*e.g.*, monitoring and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | reporting signal quality) to known products/systems to yield predictable results. |

**c. Combinations Based on Flask**

To the extent Flask does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Flask with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| Coyne | • Flask and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Flask and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | • The combination of Flask and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Flask and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Flask and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Flask and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Flask and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Flask and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Flask and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Flask and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Flask and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | qualities of a full spectrum band with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Flask and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Flask and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Flask's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| U.S. Patent No. 5,535,240 (Filed Oct. 29, 1993, Issued Jul. 9, 1996) ("Carney") | • Flask and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Pugel '520 | • Flask and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | • Combining Flask and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| U.S. Patent No. 6,704,372 (Filed Sept. 18, 2001, Issued Mar. 9, 2004) ("Zhang") | • Flask and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| U.S. Patent Publication No. 2009/0290602 (Published Nov. 26, 2009) ("McNeely") | • Flask and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| Lee | • Flask and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |
| Chen '760 | • Flask and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| BCM4528 Announcement | • Flask and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Flask and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Flask's system for receiving and analyzing signals.<br><br>• Combining Flask and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**d. Combinations Based on Caporizzo**

To the extent Caporizzo does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Caporizzo with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| Coyne | • Caporizzo and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | received spectrum with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Caporizzo and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Caporizzo and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Caporizzo and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Caporizzo and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | transmission of media content with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Caporizzo and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Caporizzo and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Caporizzo and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Caporizzo and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Caporizzo and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Caporizzo and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Caporizzo and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Carney | • Caporizzo and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | • Combining Caporizzo and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • Caporizzo and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Caporizzo and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Yu would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Caporizzo and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Pugel '520 | • Caporizzo and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| Zhang | • Caporizzo and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • Caporizzo and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • Caporizzo and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • Caporizzo and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Caporizzo and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Caporizzo's system for receiving and analyzing signals.<br><br>• Combining Caporizzo and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**e. Combinations Based on Velazquez**

To the extent Velazquez does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated

to combine Velazquez with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| Maycock | • Maycock and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Maycock and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would have been obvious in view of Maycock because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Maycock and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Petrovic and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Petrovic and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would have been obvious in view of Petrovic because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Petrovic and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Coyne and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum and/or satellite signals. Additionally, both Coyne and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals and disclose satellite systems. Both Coyne and Velazquez also disclose and relate to receivers for military communications.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Coyne and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals. Combining the disclosures of Velazquez and Coyne to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Coyne and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | of a signal) to known products/systems to yield predictable results. Further combining the systems and techniques from Velazquez and Coyne would have been the extension of known wideband capture techniques and would have had predictable results.<br><br>• The combination of Coyne and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed.<br><br>• Combining Coyne and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Velazquez and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Flask would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Velazquez and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Caporizzo would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Full Band Capture Chip System | • The Full Band Capture Chip System and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum and/or satellite signals. Additionally, both the Full Band Capture Chip System and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals and disclose satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Velazquez and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Velazquez to capture, channelize, analyze and report on the full spectrum of a received television spectrum would have been a logical extension of the existing and described techniques.<br><br>• Implementing television full band capture and analysis/monitoring in Velazquez would have been the extension of known wideband capture techniques and would |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring in television systems, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones the Full Band Capture Chip System was designed to capture. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining the Full Band Capture Chip System and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Cavanagh | • Velazquez and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Velazquez and DVB relate to the same and/or related field because both relate to signal processing and analysis, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and DVB would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Velazquez and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and ITU would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| Gomez | • Velazquez and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Gomez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| BCM4528 | • Velazquez and the BCM4528 chip relate to the same and/or related fields of processing received transmissions, such as satellite transmissions. Both Velazquez and the BCM4528 chip disclose satellite TV systems and processing and analyzing signals carried over satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the BCM4528 chip with Velazquez because Velazquez also discloses monitoring and rendering signals transmitted by RF and/or satellite systems.<br><br>• Capturing the entire satellite television spectrum of content would have been obvious in view of the BCM4528 chip and Velazquez and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of the BCM4528 chip and Velazquez to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | • Implementing full band capture and analysis/monitoring of satellite television in Velazquez would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the BCM4528 chip.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in BCM4528. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining BCM4528 and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Currivan | • Currivan and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Currivan and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire television spectrum of content would have been obvious in view of Velazquez and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would have been obvious in view of Currivan because the receiver components and techniques disclosed in each are similar. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | • Combining Currivan and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Tang | • Tang and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Tang and Velazquez relate to monitoring and analysis of wideband signals and both disclose adaptive receivers that digitize received signals.<br><br>• Capturing and analyzing the entire television spectrum of content would have been obvious in view of Velazquez and Tang and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Tang to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television would have been obvious in view of Tang because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Tang and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Sadja | • Velazquez and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion and channelizing with Sadja's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Velazquez and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Velazquez and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | analyzing/reporting signal quality with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Lee | • Velazquez and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality and adjusting based on the analysis with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |

### f. Combinations Based on Petrovic

To the extent Petrovic does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Petrovic with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| Maycock | • Maycock and Petrovic relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | both Maycock and Petrovic relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Petrovic and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Petrovic and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Petrovic would have been the application of known techniques to similar products/systems.<br><br>• Combining Maycock and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Petrovic and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Petrovic and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | have been obvious in view of Petrovic because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Velazquez and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Petrovic and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. Additionally, both Coyne and Petrovic relate to monitoring and analysis of received content, including satellite transmitted content. For example, it would have been obvious to combine the techniques disclosed in Coyne for satellite communications with Petrovic because Petrovic also discloses satellite systems, including satellite TV systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Coyne and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Coyne and Petrovic to capture, channelize, analyze and report on the full spectrum of received satellite TV content would have been a logical extension of the existing and described techniques.<br><br>• The combination of Coyne and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Coyne would have been the application of known techniques (e.g., monitoring |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | transmission of media content) to known products/systems to yield predictable results. |
| Flask | • Petrovic and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Flask would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Caporizzo | • Petrovic and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Caporizzo would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| Full Band Capture Chip System | • Petrovic and the Full Band Capture Chip System relate to the same and/or related fields of processing television transmissions. Both Petrovic and the Full Band Capture Chip System disclose cable TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the Full Band Capture Chip System with Petrovic because Petrovic also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Petrovic would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Petrovic. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining the Full Band Capture Chip System and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| Cavanagh | • Petrovic and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Cavanagh would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| ITU | • Petrovic and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and ITU would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| DVB | • Petrovic and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and DVB would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Gomez | • Petrovic and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Gomez would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| BCM4528 | • Petrovic and the BCM4528 chip relate to the same and/or related fields of processing television transmissions, including satellite TV. Both Petrovic and the BCM4528 chip disclose satellite TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | techniques implemented and/or disclosed in the BCM4528 chip with Petrovic because Petrovic also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the BCM4528 chip and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of the BCM4528 chip and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Petrovic would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the BCM4528 chip.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Petrovic. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining BCM4528 and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Currivan | • Petrovic and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Petrovic and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | • Capturing the entire spectrum of content would have been obvious in view of Petrovic and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Petrovic and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Petrovic and Currivan would have been the application of known techniques to similar products/systems.<br><br>• Combining Currivan and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Tang | • Petrovic and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Petrovic and Tang relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Petrovic and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Petrovic relating to monitoring, capturing, analyzing and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | reporting on broadcasted signals to determine the use and failure to use particular content.<br><br>• Combining Tang and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Carney | • Petrovic and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • Petrovic and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Petrovic and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Petrovic and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Petrovic's system for digitizing, monitoring, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | • Combining Petrovic and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Pugel '520 | • Petrovic and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Petrovic and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • Petrovic and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Petrovic and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • Petrovic and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • Petrovic and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

### g. Combinations Based on Full Band Capture Chip System

To the extent the Full Band Capture Chip System does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine the Full Band Capture Chip System with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| Coyne | • Coyne and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving, digitizing, and monitoring full spectrum) to known products/systems to yield predictable results. |
| Maycock | • Maycock and the Full Band Capture Chip System relate to the same and/or related fields of processing television transmissions. Both Maycock and the Full Band Capture Chip System disclose cable TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | Full Band Capture Chip System with Maycock because Maycock also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Maycock would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Maycock. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining Maycock and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • The Full Band Capture Chip System and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum and/or satellite signals. Additionally, both the Full Band Capture Chip System and Velazquez relate to monitoring and analysis of wideband signals and both |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | disclose receivers that digitize received signals and disclose satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Velazquez and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Velazquez to capture, channelize, analyze and report on the full spectrum of a received television spectrum would have been a logical extension of the existing and described techniques.<br><br>• Implementing television full band capture and analysis/monitoring in Velazquez would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring in television systems, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones the Full Band Capture Chip System was designed to capture. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining Velazquez and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Broadcom Full Band Capture Chip System and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and Flask would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Caporizzo | • Broadcom Full Band Capture Chip System and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and Caporizzo would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Petrovic | • Petrovic and the Full Band Capture Chip System relate to the same and/or related fields of processing television |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | transmissions. Both Petrovic and the Full Band Capture Chip System disclose cable TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the Full Band Capture Chip System with Petrovic because Petrovic also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Petrovic would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Petrovic. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining Petrovic and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Cavanagh | • Broadcom Full Band Capture Chip System and Cavanagh relate to the same and/or related field because both relate to |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and Cavanagh would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results.<br><br>• Combining the Full Band Capture Chip System and Cavanagh would have further been obvious because both came from Broadcom and relate to digitizing and capturing received television content. |
| ITU | • Broadcom Full Band Capture Chip System and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | • Combining Broadcom Full Band Capture Chip System and ITU would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| DVB | • Broadcom Full Band Capture Chip System and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and DVB would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Gomez | • Broadcom Full Band Capture Chip System and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving and monitoring full spectrum with Broadcom |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and Gomez would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Currivan | • The Full Band Capture Chip System and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both the Full Band Capture Chip System and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and the Full Band Capture Chip System and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and the Full Band Capture Chip System to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining the Full Band Capture Chip System and Currivan would have been the application of known techniques to similar products/systems.<br><br>• Combining Currivan and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Tang | • The Full Band Capture Chip System and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both the Full Band |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | Capture Chip System and Tang relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and the Full Band Capture Chip System and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and the Full Band Capture Chip System to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining the Full Band Capture Chip and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and the Full Band Capture Chip relating to digitizing an entire television spectrum and then analyzing and reporting on received signals. |
| BCM4528 | • It would have been obvious to combine the disclosures of the Full Band Capture Chip System and the BCM4528 to apply the teachings to satellite television because both relate to the same and/or related fields of receiving, digitizing and processing full television spectrums arriving at a receiver. Specifically, the Full Band Capture Chip System specifically discloses capturing an entire cable TV spectrum of channels, while the BCM4528 chip discloses the same technique for satellite TV transmissions.<br><br>• A POSITA further would have been motivated to combine Full Band Capture Chip System and the BCM4528 because both involved chips from the same company (Broadcom) that perform similar functions (capturing an entire television spectrum).<br><br>• Incorporating signal analysis and reporting, such as in DOCSIS 3.0 in the Full Band Capture Chip System, into a satellite system would have provided expected and advantageous results. Such a combination would have been |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | the application of known techniques to the similar products/systems.<br><br>• Combining BCM4528 and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Sadja | • Broadcom Full Band Capture Chip System and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of the Broadcom Full Band Capture Chip System and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of the Broadcom Full Band Capture Chip System with respect to analog-to-digital conversion and channelizing with Sadja's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining the Broadcom Full Band Capture Chip System and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Broadcom Full Band Capture Chip System and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of the Broadcom Full Band Capture Chip System and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of the Broadcom Full Band Capture Chip System with respect to analog-to-digital conversion and channelizing with the Yu's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining the Broadcom Full Band Capture Chip System and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Broadcom Full Band Capture Chip System and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of the Broadcom Full Band Capture Chip System and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with the Broadcom Full Band Capture Chip System for digitizing, channelizing, and analyzing received signals.<br><br>• Combining the Broadcom Full Band Capture Chip System and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Lee | • Broadcom Full Band Capture Chip System and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | • The combination of the Broadcom Full Band Capture Chip System and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality and adjusting based on the analysis with the Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining the Broadcom Full Band Capture Chip System and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |

**h. Combinations Based on Cavanagh**

To the extent Cavanagh does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Cavanagh with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| Coyne | • Cavanagh and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | received spectrum with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Cavanagh and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Cavanagh and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Cavanagh and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Cavanagh and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Cavanagh and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Cavanagh and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | monitoring full spectrum with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| ITU | • Cavanagh and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Cavanagh and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | • Combining Cavanagh and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Cavanagh and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Cavanagh and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Cavanagh's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | • Combining Cavanagh and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Cavanagh and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Sadja | • Cavanagh and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Cavanagh and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Cavanagh and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| Lee | • Cavanagh and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • Cavanagh and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Cavanagh and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Cavanagh's system for receiving and analyzing signals.<br><br>• Combining Cavanagh and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

### i. Combinations Based on ITU

To the extent ITU does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine ITU with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| Coyne | • ITU and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • ITU and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • ITU and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • ITU and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • ITU and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • ITU and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • ITU and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • ITU and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | monitoring/measuring qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • ITU and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • ITU and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | qualities of a full spectrum band with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • ITU and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • ITU and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with ITU's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | • Combining ITU and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Carney | • ITU and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • ITU and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | channelizing) to known products/systems to yield predictable results. |
| Yu | • ITU and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • ITU and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| Pugel '520 | • ITU and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • ITU and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • ITU and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • ITU and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • ITU and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture. |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | • The combination of ITU and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with ITU's system for receiving and analyzing signals.<br><br>• Combining ITU and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**j. Combinations Based on DVB**

To the extent DVB does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine DVB with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| Coyne | • DVB and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | spectrum) to known products/systems to yield predictable results. |
| Maycock | • DVB and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • DVB and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| Caporizzo | • DVB and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • DVB and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • DVB and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • DVB and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • DVB and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • DVB and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • DVB and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • DVB and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • DVB and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Carney | • DVB and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • DVB and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | • The combination of DVB and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • DVB and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • DVB and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Pugel '520 | • DVB and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • DVB and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • DVB and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • DVB and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • DVB and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of DVB and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with DVB's system for receiving and analyzing signals.<br><br>• Combining DVB and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**k. Combinations Based on Gomez**

To the extent Gomez does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Gomez with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| Coyne | • Gomez and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | • The combination of Gomez and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Gomez and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Gomez and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | • The combination of Gomez and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Gomez and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Gomez and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Gomez and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Gomez and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Gomez and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Gomez and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Gomez and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Currivan | • Gomez and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | respect to receiving and measuring/analyzing a full received spectrum with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Gomez and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Chen '010 | • Gomez and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | analyzing/reporting signal quality with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| McNeely | • Gomez and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • Gomez and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Gomez and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Gomez's system for receiving and analyzing signals.<br><br>• Combining Gomez and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full- |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | band capture technology) to known products/systems to yield predictable results. |

### l. Combinations Based on Currivan

To the extent Currivan does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Currivan with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| Maycock | • Maycock and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Maycock and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Currivan would have been the application of known techniques (e.g., analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Petrovic and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Petrovic and Currivan relate to monitoring and analysis |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Petrovic and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Petrovic and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Petrovic and Currivan would have been the application of known techniques to similar products/systems.<br><br>• Combining Currivan and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Currivan and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Currivan and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire television spectrum of content would have been obvious in view of Velazquez and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | have been obvious in view of Currivan because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Currivan and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Currivan and Coyne relate to the same and/or related field because both relate to signal processing and analysis and specifically both disclose satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. Additionally, both Currivan and Coyne relate to monitoring and analysis of received content, including satellite transmitted content. For example, it would have been obvious to combine the techniques disclosed in Coyne for satellite communications with Currivan because Currivan discloses satellite TV systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Coyne and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Coyne and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• The combination of Coyne and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Currivan would have been the application of known techniques (*e.g.*, receiving and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Flask | • Currivan and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and Flask would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Caporizzo | • Currivan and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and Currivan would have been the application of known techniques (*e.g.*, receiving and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Full Band Capture Chip System | • The Full Band Capture Chip System and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both the Full Band Capture Chip System and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and the Full Band Capture Chip System and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and the Full Band Capture Chip System to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining the Full Band Capture Chip System and Currivan would have been the application of known techniques to similar products/systems.<br><br>• Combining the Full Band Capture Chip System and Currivan would have further been obvious because both came from Broadcom and relate to digitizing and capturing received television content.<br><br>• Combining Currivan and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Cavanagh | • Currivan and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | • The combination of Currivan and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and Cavanagh would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| ITU | • Currivan and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and ITU would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| DVB | • Cavanagh and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and DVB would have yielded predictable and desirable results of digitizing, channelizing, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and DVB would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Currivan and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and Gomez would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Currivan and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Tang and Currivan relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and Tang and would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and Tang to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Currivan and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Currivan relating to analysis/monitoring and display of received television signals.<br><br>• Combining Currivan and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| BCM4528 | • It would have been obvious to combine the disclosures of the Currivan and the BCM4528 to apply the teachings to satellite television because both relate to the same and/or related fields of receiving, digitizing and processing full television spectrums arriving at a receiver. Specifically, Currivan specifically discloses capturing a received TV spectrum of channels, while the BCM4528 chip discloses the same technique for satellite TV transmissions.<br><br>• A POSITA further would have been motivated to combine Currivan and the BCM4528 because both involved chips from the same company (Broadcom) that perform similar functions (capturing and analyzing television spectrum).<br><br>• Incorporating signal analysis and reporting, such as in DOCSIS 3.0 in the Full Band Capture Chip System, into a satellite system would have provided expected and advantageous results. Such a combination would have been the application of known techniques to the similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | • Combining Currivan and BCM4528 would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Carney | • Currivan and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Currivan system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • Currivan and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Currivan and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Currivan and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| Pugel '520 | • Currivan and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Currivan and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • Currivan and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Currivan and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • Currivan and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • Currivan and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

**m. Combinations Based on Tang**

To the extent Tang does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to

combine Tang with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| Maycock | • Maycock and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Maycock and Currivan relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Maycock relating to analysis/monitoring and display of received television signals.<br><br>• Combining Maycock and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Petrovic and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Petrovic and Currivan relate to monitoring and analysis of received transmissions in television systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | • Capturing the entire spectrum of content would have been obvious in view of Tang and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Petrovic and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Maycock relating to monitoring, capturing, analyzing and reporting on broadcasted signals to determine the use and failure to use particular content.<br><br>• Combining Petrovic and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Tang and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Tang and Velazquez relate to monitoring and analysis of wideband signals and both disclose adaptive receivers that digitize received signals.<br><br>• Capturing and analyzing the entire television spectrum of content would have been obvious in view of Velazquez and Tang and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Tang to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | • Applying the systems and techniques disclosed in Velazquez to television would have been obvious in view of Tang because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Petrovic and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Tang and Coyne relate to the same and/or related field because both relate to signal processing and analysis and specifically both disclose sensing to determine which channels are receiving signals/carrying content. Tang and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Additionally, both Tang and Coyne relate to monitoring and analysis of received content. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Coyne and Tang and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Coyne and Tang to capture, channelize, analyze and report on a full television spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• The combination of Tang and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Tang would have been the application of known techniques (*e.g.*, analog-to-digital conversion, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | channelizing, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Flask | • Tang and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and Flask would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Caporizzo | • Tang and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and Caporizzo would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| Full Band Capture Chip System | • The Full Band Capture Chip System and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both the Full Band Capture Chip System and Tang relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and the Full Band Capture Chip System and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and the Full Band Capture Chip System to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining the Full Band Capture Chip System and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and the Full Band Capture Chip System relating to digitizing an entire television spectrum and then analyzing and reporting on received signals.<br><br>• Combining the Full Band Capture Chip and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Cavanagh | • Tang and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and Cavanagh would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| ITU | • Tang and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and ITU would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| DVB | • Tang and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to spectrum analysis and reporting with Tang's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and DVB would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Gomez | • Tang and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and Gomez would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Currivan | • Currivan and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Tang and Currivan relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and Tang and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and Tang to capture, channelize, analyze and report on the full spectrum of received content |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | would have been a logical extension of the existing and described techniques.<br><br>• Combining Currivan and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Currivan relating to analysis/monitoring and display of received television signals. |
| BCM4528 | • It would have been obvious to combine the disclosures of the Tang and the BCM4528 to apply the teachings to satellite television because both relate to the same and/or related fields of receiving, digitizing and processing full television spectrums arriving at a receiver. Specifically, Tang specifically discloses monitoring and capturing a received TV spectrum of channels, while the BCM4528 chip discloses a similar technique for satellite TV transmissions.<br><br>• A POSITA further would have been motivated to combine Tang and the BCM4528 because both involved chips from the same company (Broadcom) that perform similar functions (capturing and analyzing television spectrum).<br><br>• Incorporating signal analysis and reporting, such as in DOCSIS 3.0 in the Full Band Capture Chip System, into a satellite system would have provided expected and advantageous results. Such a combination would have been the application of known techniques to the similar products/systems.<br><br>• Combining the BCM4528 and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Carney | • Tang and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the c television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | • The combination of Tang and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Tang system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • Tang and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Tang and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Tang and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Pugel '520 | • Tang and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Tang and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • Tang and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Tang and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • Tang and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • Tang and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

**n. Combinations Based on Renken**

To the extent Renken does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Renken with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| Coyne | • Renken and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Renken and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Renken and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Renken and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Renken and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | • The combination of Renken and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Renken and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture System | • Renken and Broadcom Full Band Capture System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | • The combination of Renken and Broadcom Full Band Capture System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture System with respect to receiving and monitoring full spectrum with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Broadcom Full Band Capture System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Renken and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Renken and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | • The combination of Renken and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Renken and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Renken and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Renken and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Renken and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| DOCSIS | • Renken and DOCSIS relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and DOCSIS would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DOCSIS with respect to measuring and reporting signal characteristics with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and DOCSIS would have been the application of known techniques (*e.g.*, measuring and reporting signal characteristics) to known products/systems to yield predictable results.<br><br>• Combining Renken and DOCSIS would have been obvious to a POSITA because Renken cites to and applies the DOCSIS standards throughout its disclosure. |
| BCM4528 Announcement | • Renken and BCM4528 Announcement relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and BCM4528 Announcement would have yielded predictable and desirable results of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement with respect to receiving and monitoring full spectrum with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and BCM4528 Announcement would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Sadja | • Renken and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Renken and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Renken and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Lee | • Renken and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality with Renken's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |

**4. Secondary Considerations**

A patentee bears the burden of production with respect to evidence of secondary considerations of non-obviousness. *ZUP, LLC v. Nash Mfg., Inc.*, 896 F.3d 1365, 1373 (Fed. Cir. 2018). As of the date of these Invalidity Contentions, Plaintiff has not identified any secondary considerations of non-obviousness. Defendants reserve all rights to respond to any secondary considerations of non-obviousness raised by Plaintiff, including by updating, modifying, and/or adding to these Invalidity Contentions. Defendants are not aware of any unexpected results (none is mentioned in the Asserted Patents or their file history), long felt need, commercial success (or any nexus to any allegedly successful commercial embodiment), or awards for the Asserted Patents. Indeed, as shown in these Invalidity Contentions, dozens of other companies and individuals described, built, and/or patented the exact same concepts in the Asserted Patents before Plaintiff ever did—often many years before. Even where others' inventions occurred at approximately the same time as the alleged invention in the Asserted Patents, such simultaneous invention further demonstrates the obviousness of the Asserted Patents.

## VII. P.R. 3-3(c) – CLAIM CHARTS

The attached claim charts (Exhibits A1–C14 and Appendices A–C) are based, in whole or in part, on Plaintiff's asserted theories of infringement in this case, to the extent discernible from Plaintiff's Infringement Contentions. As an initial matter, all portions of each prior art reference

cited in each of the attached claim charts are relied upon to support the disclosure of each patent claim limitation, as all portions provide general support. Representative descriptions and supporting citations are nevertheless provided, but are merely exemplary; they do not necessarily reflect every instance where a particular claim term or claim limitation may be disclosed in or taught by the prior art reference. References to figures or drawings refer to the figures/drawings themselves, as well as to any accompanying text or text necessary to understand the figures or drawings. References to text refers to the text itself, as well as the accompanying figures or drawings that accompany the text. Defendants reserve the right to rely on additional, or different, portions of the prior art references, other publications and expert testimony to establish what these references would have taught one of ordinary skill in the art, or in what manner they would have motivated a particular combination of references. Defendants reserve the right to rely on any and all documents that describe or relate to prior art systems, including relying on the system itself. Defendants also reserve the right to rely on the testimony of the authors, named inventors, or anyone else with knowledge of the prior art references and systems identified herein, as well as expert testimony regarding any such references or systems.

## VIII. P.R. 3-3(d) – INVALIDITY UNDER 35 U.S.C. § 112

Defendants provide the following grounds for invalidity under 35 U.S.C. § 112, ¶¶ 1–2. Defendants' investigation of the Asserted Patents is ongoing, and Defendants reserve the right to amend or supplement these disclosures based on further investigation and in a manner consistent with the Federal Rules of Civil Procedure, the Local Patent Rules for the Eastern District of Texas, and the Docket Control Order, or otherwise in accordance with any order or direction of this Court or agreement of the parties. Further, Plaintiff's Infringement Contentions fail to provide sufficient detail to fully understand its proposed application of the Asserted Claims, and Defendants reserve the right to assert additional grounds for invalidity under 35 U.S.C. § 112 in response to Plaintiff's

claim interpretations. Defendants also reserve the right to supplement, modify, or otherwise amend these grounds for invalidity under 35 U.S.C. § 112 based on the Court's claim construction rulings or opinions or the parties' positions or arguments taken in connection with the claim construction process.

In addition, Defendants identify claims below that are indefinite under 35 U.S.C. § 112 ¶ 2, which Defendants will more fully address these grounds as part of claim construction.[12] Defendants reserve the right to provide additional explanation and/or argument for their Invalidity Contentions under Section 112, including, for example, based on expert testimony.

## A. '576 Patent

### 1. Indefiniteness

The Asserted Claims of the '576 patent are invalid as set forth below under 35 U.S.C. § 112, ¶ 2 for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the alleged invention. For example, the scope of the following claim terms is not reasonably certain, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid as indefinite:

#### a. "communicating a transponder request signal to the ODU from the IRD" (claim 14)

The scope of the term "communicating a transponder request signal to the ODU from the IRD" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a transponder request signal," such as by providing examples. It is not reasonably

[12] Any dependent claim is invalid if it depends, directly or indirectly, on another claim that is invalid under 35 U.S.C. § 112.

certain to a person of ordinary skill what constitutes "communicating a transponder request signal to the ODU from the IRD."

**b. "in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received digitized satellite broadband signals, wherein the selecting is responsive to the transponder request signals" (claim 14)**

The scope of the term "in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received digitized satellite broadband signals, wherein the selecting is responsive to the transponder request signals" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as a "plurality of satellite broadband signals," "a plurality of transponder signals," and "selecting is responsive to the transponder request signals," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received digitized satellite broadband signals, wherein the selecting is responsive to the transponder request signals."

**c. "combining extracted selected transponder signals into a composite signal" (claim 14)**

The scope of the term "combining extracted selected transponder signals into a composite signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "extracted selected transponder signals," and "a composite signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "combining extracted selected transponder signals into a composite signal."

**d. "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting" (claim 14)**

The scope of the term "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting," such as by providing examples. And "the IRDs" lacks an antecedent basis. It is not reasonably certain to a person of ordinary skill what constitutes "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting."

**e. "filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal" (claims 15)**

The scope of the term "filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a transponder signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal."

**f. "comprises frequency translating the selected and extracted transponder channels to a variable [or predetermined] frequency before combining" and similar limitations (claims 16, 17, 21)**

The scope of the term "comprises frequency translating the selected and extracted transponder channels to a variable [or predetermined] frequency before combining" in claims 16 and 17 (and a similar limitation in claim 21) is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as a "transponder channel," "a variable frequency" and "a predetermined frequency," such as by providing examples. Additionally, the "transponder channel" lacks an antecedent basis. It is not reasonably certain to a person of ordinary skill what constitutes "comprises frequency translating the selected and extracted transponder channels to a variable [or predetermined] frequency before combining."

**g. "splitting the composite signal inside a home and distributing to a plurality of IRDs" (claims 18, 21)**

The scope of the term "splitting the composite signal inside a home and distributing to a plurality of IRDs" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the composite signal" and "inside a home," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "splitting the composite signal inside a home and distributing to a plurality of IRDs."

**h. "wherein the transponder request signal is transmitted over a wireless link to the ODU" (claims 20, 23)**

The scope of the term "wherein the transponder request signal is transmitted over a wireless link to the ODU" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the transponder request signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the transponder request signal is transmitted over a wireless link to the ODU."

**i. "wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal" (claim 34)**

The scope of the term "wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the digitized broadband signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal."

**j. "converting the selected signal to an analog signal using a digital to analog converter prior to combining" (claim 35)**

The scope of the term "converting the selected signal to an analog signal using a digital to analog converter prior to combining" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the selected signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "converting the selected signal to an analog signal using a digital to analog converter prior to combining."

**k. "wherein the combining is performed in the digital domain" (claim 36)**

The scope of the term "wherein the combining is performed in the digital domain" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "combining . . . in the digital domain," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the combining is performed in the digital domain."

**l. "wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency" (claim 37)**

The scope of the term "wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a digital mixer," "a rotating phasor," and "the data samples," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency."

**m. "frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" (claim 38)**

The scope of the term " frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the digitized broadband signal" and "transponder signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes " frequency translating the digitized broadband signal prior to selecting and extracting transponder signal."

**n. "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" (claim 39)**

The scope of the term "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the original

digitized broadband signal," "a selected transponder channel," and "baseband," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband."

**o. "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" (claim 40)**

The scope of the term "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a channel translation table," "assigned frequency slots," "transponder channels," and "the composite signal," such as by providing examples. Additionally, the "transponder channels" lacks an antecedent basis. It is not reasonably certain to a person of ordinary skill what constitutes "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal."

**p. "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel" (claim 41)**

The scope of the term "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the channel translation table," and "a desired selected translated transponder channel," such as by providing examples. Additionally, the "transponder channel" lacks an antecedent basis. It is not reasonably certain to a person of

ordinary skill what constitutes "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel."

**q. "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels" (claim 42)**

The scope of the term "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the translated digitized broadband signal" and "non-selected transponder channels," such as by providing examples. Additionally, "substantially removing signal information" is indefinite as it is a term of degree and does not inform, with reasonable certainty, the scope of the invention. It is not reasonably certain to a person of ordinary skill what constitutes "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels."

* * *

In view of the specification and file history of the Asserted Patent, the above terms (and any other similar terms in any of the Asserted Claims) fail to inform those skilled in the art about the scope of the invention with reasonable certainty. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014) (holding that "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention"). As such, the asserted claims identified above are invalid for being indefinite. *See id.*

### 2. Lack of Written Description and/or Enablement

The Asserted Claims of the '576 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112, ¶ 1. For example, the specification of the '576 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid:

#### a. "transponder request signal(s)" / "transponder signal(s)"

| Claim Term | Asserted Claims |
|---|---|
| "communicating a transponder request signal to the ODU from the IRD" | 14 |
| "in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received digitized satellite broadband signals, wherein the selecting is responsive to the transponder request signals" | 14 |
| "combining extracted selected transponder signals into a composite signal" | 14 |
| "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting" | 14 |
| "filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal" | 15 |
| "wherein the transponder request signal is transmitted over a wireless link to the ODU" | 20, 23 |
| "frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" | 38 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a transponder request signal or transponder signal. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full

scope of this limitation in the context of using a transponder request signal or transponder signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**b. "composite signal"**

| Claim Term | Asserted Claims |
|---|---|
| "combining extracted selected transponder signals into a composite signal" | 14 |
| "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting" | 14 |
| "splitting the composite signal inside a home and distributing to a plurality of IRDs" | 18, 21 |
| "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" | 40 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a composite signal. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a composite signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**c. "transmitting the composite signal over the single cable to the IRDs"**

| Claim Term | Asserted Claims |
|---|---|
| "transmitting the composite signal over the single cable to the IRDs," | 14 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims).

For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**d. "the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting." | 14 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**e. "transponder channel(s)"**

| Claim Term | Asserted Claims |
|---|---|
| "comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining" | 16, 21 |
| "comprises frequency translating the selected and extracted transponder channels to a predetermined frequency before combining" | 17 |
| "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" | 39 |
| "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" | 40 |

| Claim Term | Asserted Claims |
|---|---|
| "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel" | 41 |
| "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels" | 42 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with transponder channels. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using transponder channels. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**f. "a wireless link"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein the transponder request signal is transmitted over a wireless link to the ODU" | 20, 23 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a wireless. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a wireless link. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

### g. "digitized broadband signal" / "original digitized broadband signal"

| Claim Term | Asserted Claims |
|---|---|
| "wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal" | 34 |
| "frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" | 38 |
| "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" | 39 |
| "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels" | 42 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a digitized broadband signal. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a digitized broadband signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

### h. "converting the selected signal to an analog signal"

| Claim Term | Asserted Claims |
|---|---|
| "converting the selected signal to an analog signal using a digital to analog converter prior to combining" | 35 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '576 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to convert the selected signal to an analog signal. Nor does the specification of the '576 patent evidence that the named inventors were in possession of this

technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**i. "frequency translating . . . "**

| Claim Term | Asserted Claims |
|---|---|
| "comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining" | 16, 21 |
| "comprises frequency translating the selected and extracted transponder channels to a predetermined frequency before combining" | 17 |
| "wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency" | 37 |
| "frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" | 38 |
| "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" | 39 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '576 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to perform frequency translating. Nor does the specification of the '576 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**j. "channel translation table"**

| Claim Term | Asserted Claims |
|---|---|
| "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" | 40 |
| "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel" | 41 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '576 patent does not sufficiently explain how to a POSITA, without undue experimentation, to make a channel translation table. Nor does the specification of the '576 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**k. "frequency slots"**

| Claim Term | Asserted Claims |
|---|---|
| "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" | 40 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with frequency slots. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using frequency slots. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

## B. '715 Patent

### 1. Indefiniteness

The Asserted Claims of the '715 patent are invalid as set forth below under 35 U.S.C. § 112, ¶ 2 for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the alleged invention. For example, the scope of the following claim terms is

not reasonably certain, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid as indefinite:

**a. "a gateway in communication with the ODU and at least one set top box (STB)" (claim 9)**

The scope of the term "a gateway in communication with the ODU and at least one set top box (STB)" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a gateway," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a gateway in communication with the ODU and at least one set top box (STB)."

**b. "a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information" (claim 9)**

The scope of the term "a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "transponder signals" and "gateway," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information."

**c. "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals" (claim 9)**

The scope of the term "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "transponder signals," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals."

**d. "a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal" (claim 9)**

The scope of the term "a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a composite signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal."

**e. "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs" (claim 9)**

The scope of the term "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the

gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the composite signal," "gateway," and "specific programs," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs."

**f. "wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output" (claim 10)**

The scope of the term "wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a translation table," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output."

**g. "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network" (claim 11)**

The scope of the term "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the

translation table" and the "devices in the network," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network."

**h. "wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network" (claim 12)**

The scope of the term "wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the translation table" and the "devices in the network," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network."

* * *

In view of the specification and file history of the Asserted Patent, the above terms (and any other similar terms in any of the Asserted Claims) fail to inform those skilled in the art about the scope of the invention with reasonable certainty. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014) (holding that "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention"). As such, the asserted claims identified above are invalid for being indefinite. *See id.*

### 2. Lack of Written Description and/or Enablement

The Asserted Claims of the '715 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112, ¶ 1. For example, the specification of the '576 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid:

#### a. "gateway"

| Claim Term | Asserted Claims |
|---|---|
| "a gateway in communication with the ODU and at least one set top box (STB)" | 9 |
| "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs" | 9 |
| "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network" | 11 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '715 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a gateway. Furthermore, the specification of the '715 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a gateway. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**b. "transponder signal(s)"**

| Claim Term | Asserted Claims |
|---|---|
| "a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information" | 9 |
| "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals" | 9 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '715 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with transponder signals. Furthermore, the specification of the '715 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using transponder signals. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**c. "shifting the selected transponder signals to new carrier frequencies to produce RF signals"**

| Claim Term | Asserted Claims |
|---|---|
| "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals" | 9 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '715 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to perform shifting the selected transponder signals to new carrier

frequencies to produce RF signals. Nor does the specification of the '715 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**d. "combining at least two RF signals to produce a composite signal"**

| Claim Term | Asserted Claims |
|---|---|
| "a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal" | 9 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '715 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to perform combining at least two RF signals to produce a composite signal. Nor does the specification of the '715 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**e. "decodes specific programs"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs" | 9 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '715 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to decode specific programs. Nor does the specification of the '715 patent evidence that the named inventors were in possession of this technology. The Asserted

Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**f. "translation table"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output" | 10 |
| "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network" | 11 |
| "wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network" | 12 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '715 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a translation table. Furthermore, the specification of the '715 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a translation table. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**g. "communicated to devices in the network"**

| Claim Term | Asserted Claims |
|---|---|
| "The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network." | 11 |
| "The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network." | 12 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims).

For example, the specification of the '715 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system. Furthermore, the specification of the '715 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a translation table. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

## C. '008 Patent

### 1. Indefiniteness

The Asserted Claims of the '008 patent are invalid as set forth below under 35 U.S.C. § 112, ¶ 2 for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the alleged invention. For example, the scope of the following claim terms is not reasonably certain, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid as indefinite:

**a. "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising an plurality of television channels, said digitization resulting in a digitized signal" and similar limitations (claims 1, 3, and 11)**

The scope of the term "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising an plurality of television channels, said digitization resulting in a digitized signal" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "an analog-to-digital converter operable to digitize a received signal," "spanning an entire television spectrum," "plurality of television channels," "or digitization," such as by providing examples. It is also unclear what the "digitized signal" is, as referenced in other

elements of the claims. It is not reasonably certain to a person of ordinary skill what constitutes "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising an plurality of television channels, said digitization resulting in a digitized signal."

**a. "a signal monitor operable to" (claim 1)**

The scope of the term "a signal monitor operable to" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a signal monitor operable to," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a signal monitor operable to."

**b. "analyze said digitized signal to determine a characteristic of said digitized signal" and similar limitations (claims 1, 3, and 11)**

The scope of the term "analyze said digitized signal to determine a characteristic of said digitized signal" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "analyze said digitized signal" or "determine a characteristic of said digitized signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "analyze said digitized signal to determine a characteristic of said digitized signal."

**c. "report said determined characteristic to a source of said received signal" and similar limitations (claims 1, 3, and 11)**

The scope of the term "report said determined characteristic to a source of said received signal" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "report[ing] said determined

characteristic" or a "source of said received signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "report said determined characteristic to a source of said received signal."

**d. "a data processor operable to process a television channel to recover content [data] carried on the television channel" and similar limitations (claims 1, 3, and 11)**

The scope of the term "a data processor operable to process a television channel to recover content [data] carried on the television channel" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a data processor operable to process," "a television channel" or "content [data] carried on the television channel," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a data processor operable to process a television channel to recover content [data] carried on the television channel."

**e. "a channelizer operable to" (claim 1)**

The scope of the term "a channelizer operable to" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a channelizer operable to," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes a "a channelizer operable to."

**f. "select[ing] a first portion of said digitized signal" and "select[ing] a second portion of said digitized signal" (claims 1, 3, and 11)**

The scope of the terms "select[ing] a first portion of said digitized signal" and "select[ing] a second portion of said digitized signal" are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance

regarding the scope of this term and what qualifies as a "portion" of a digitized signal, such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "select[ing] a first portion of said digitized signal" and "select[ing] a second portion of said digitized signal."

**g. "concurrently output[ting] said first portion of said digitized signal to said signal monitor" and "concurrently output[ting] said second portion of said digitized signal to said data processor" (claims 1, 3, and 11)**

The scope of the term "concurrently output[ting] said first portion of said digitized signal to said signal monitor" and "concurrently output[ting] said second portion of said digitized signal to said data processor" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "concurrently output[ting]" signals or outputting signals to "said signal monitor" and "said data processor," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "concurrently output[ting] said first portion of said digitized signal to said signal monitor" and "concurrently output[ting] said second portion of said digitized signal to said data processor."

**h. "said digitized signal spans said entire television spectrum" and similar limitations (claims 2, 4, and 12)**

The scope of the term "said digitized signal spans said entire television spectrum" in claim 2 (and similar limitations in claims 4 and 12) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "said digitized signal spans said entire television spectrum," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "said digitized signal spans said entire television spectrum."

**i. "one or more circuits" (claims 3 and 11)**

The scope of the term "one or more circuits" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "one or more circuits," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "one or more circuits."

**j. "bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carrier a plurality of channels" (claims 3 and 11)**

The scope of the term "bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carrier a plurality of channels" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carrier a plurality of channels," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carrier a plurality of channels."

**k. "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" (claim 3) / "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" (claim 11)**

The scope of the term "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" / "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" / "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal," such as by providing examples. It is not reasonably

certain to a person of ordinary skill what constitutes "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" / "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal."

**l. "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal" (claim 3) / "said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal" (claim 11)**

The scope of the term "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal" / "said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal" / "said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received

signal, and which reports said determined one or more characteristics to a source of said received signal" / "said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal."

**m. "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" (claim 3) / "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" (claim 11)**

The scope of the term "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" / "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" / "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" / "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels."

**n. "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$" (claims 4 and 12)**

The scope of the term "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$" such

as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$."

**o. "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" (claims 5 and 13)**

The scope of the term "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate."

**p. "said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels" (claims 7 and 15)**

The scope of the term "said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes

"said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels."

**q. "wherein said one or more circuits reside in a customer premises gateway" (claims 9 and 17)**

The scope of the term "wherein said one or more circuits reside in a customer premises gateway" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "reside in a customer premises gateway," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein said one or more circuits reside in a customer premises gateway."

**r. "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits" (claims 10 and 18)**

The scope of the term "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits."

* * *

In view of the specification and file history of the Asserted Patent, the above terms (and any other similar terms in any of the Asserted Claims) fail to inform those skilled in the art about the scope of the invention with reasonable certainty. *See Nautilus, Inc. v. Biosig Instruments, Inc.*,

572 U.S. 898 (2014) (holding that "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention"). As such, the asserted claims identified above are invalid for being indefinite. *See id.*

**2. Lack of Written Description and/or Enablement**

The Asserted Claims of the '008 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112, ¶ 1. For example, the specification of the '008 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid:

**a. "analog-to-digital converter operable to digitize . . ."**

| Claim Term | Asserted Claims |
|---|---|
| "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels" | 1 |
| "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" | 3 |
| "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" | 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '008 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to digitize from analog a signal spanning an entire television spectrum. Nor does the specification of the '008 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**b. "analyze said digitized signal to determine a characteristic . . ."**

| Claim Term | Asserted Claims |
|---|---|
| "analyze said digitized signal to determine a characteristic of said digitized signal" | 1 |
| "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal" | 3, 11 |
| "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" | 5, 13 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '008 patent does not evidence that the named inventors were in possession of the full scope of this limitation as asserted against Defendants. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, including measuring all of the recited characteristics. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**c. "report said determined characteristic to a source . . ."**

| Claim Term | Asserted Claims |
|---|---|
| "report said determined characteristic to a source of said received signal" | 1 |
| "and which reports said determined one or more characteristics to a source of said received signal" | 3, 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '008 patent does not evidence that the named inventors were in possession of the full scope of this limitation as asserted against Defendants. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to

practice the full scope of this limitation, including reporting to a "source of said received signal" in the context of a satellite system. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**d. "data processor operable to process a television channel to recover content carried on the television channel"**

| Claim Term | Asserted Claims |
|---|---|
| "data processor operable to process a television channel to recover content carried on the television channel" | 1 |
| "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" | 3, 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '008 patent does not evidence that the named inventors were in possession of the full scope of this limitation as asserted against Defendants, including with respect to what "content" and "data" is recovered. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, including recovering data and/or content carried on a channel. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**e. "a channelizer operable to . . . select a first portion . . . [and] select a second portion"**

| Claim Term | Asserted Claims |
|---|---|
| "a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal" | 1 |
| "wherein said first portion of said digitized signal spans said entire television spectrum" | 2 |
| "selecting a first portion of said digitized signal; selecting a second portion of said digitized signal" | 3 |
| "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$" | 4, 12 |

| Claim Term | Asserted Claims |
|---|---|
| "select a first portion of said digitized signal; select a second portion of said digitized signal" | 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). The specification of the '008 patent does not evidence that the named inventors were in possession of a channelizer that selects the first and second portions of a signal as required by these claims. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, including selecting one or more portions of a signal, especially where one of the portions comprises the entire television spectrum signal or *all* of a received signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**f. "concurrently output . . ."**

| Claim Term | Asserted Claims |
|---|---|
| "concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor" | 1 |
| "concurrently outputting said selected first portion and said selected second portion" | 3 |
| "concurrently output said selected first portion and said selected second portion" | 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). The specification of the '008 patent does not evidence that the named inventors were in possession of the ability to concurrently output first and second portions of a signal as required by these claims. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, including concurrently outputting first

and second portions of a signal as required by these claims. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**g. "wherein said one or more characteristics is one of signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein said one or more characteristics is one of signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" | 5 and 13 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). Specifically, the '008 patent fails to provide sufficient and enabling written description regarding how to determine these characteristics, including without limitation, phaw vs. frequency, peak-to-average ratio, noise levels, bit error rate, and symbol error rate. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**h. "said received signal is a satellite television signal output by a low noise block downconverter"**

| Claim Term | Asserted Claims |
|---|---|
| "said received signal is a satellite television signal output by a low noise block downconverter" | 7, 15 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). The specification of the '008 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a low noise block downconverter. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the

context of using a low noise block downconverter. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**i. "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits" | 10, 18 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). The specification of the '008 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in which a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, such as by configuring a bandwidth or center frequency of a first portion of a signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

DATED: August 5, 2022

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**ATTORNEYS FOR DEFENDANTS DISH NETWORK CORPORATION, DISH NETWORK L.L.C., AND DISH NETWORK SERVICE L.L.C.**

**CERTIFICATE OF SERVICE**

I hereby certify that on August 5, 2022, the foregoing was served upon all counsel of record who have consented to electronic service.

*/s/ Amanda Tessar*
Amanda Tessar

**IN THE UNITED STATES DISTRICT COURT**
**FOR THE EASTERN DISTRICT OF TEXAS**
**MARSHALL DIVISION**

| | |
|---|---|
| ENTROPIC COMMUNICATIONS, LLC;<br><br>Plaintiff,<br><br>v.<br><br>DIRECTV, LLC, and<br>AT&T SERVICES, INC.,<br><br>Defendants. | Civil Action No. 2:22-CV-00075-JRG<br><br>LEAD CASE<br><br>JURY TRIAL DEMANDED |
| ENTROPIC COMMUNICATIONS, LLC;<br><br>Plaintiff,<br><br>v.<br><br>DISH NETWORK CORPORATION;<br>DISH NETWORK L.L.C.; and<br>DISH NETWORK SERVICE L.L.C.,<br><br>Defendants. | Civil Action No. 2:22-CV-00076-JRG<br><br>MEMBER CASE |

**DEFENDANTS' P.R. 3-3 INVALIDITY CONTENTIONS**

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## EXHIBITS AND APPENDICES

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| **Appendix A** | Additional References and Obviousness Chart for '576 Patent |
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Pursuant to P.R. 3-3 and the Court's Docket Control Order (Dkt. 49), Defendants DIRECTV, LLC and AT&T Services, Inc. (collectively, "Defendants") hereby provide these P.R. 3-3 Invalidity Contentions ("Invalidity Contentions") to Plaintiff Entropic Communications, LLC ("Plaintiff" or "Entropic").

## I. INTRODUCTORY STATEMENT

These Invalidity Contentions are based on Defendants' current knowledge and understanding of U.S. Patent Nos. 7,130,576 ("the '576 patent"); 7,542,715 ("the '715 patent"); and 8,792,008 ("the '008 patent") (collectively, "the Asserted Patents") and the prior art, along with Defendants' understanding of Plaintiff's infringement allegations and apparent claim interpretations based on those allegations, as set forth in Plaintiff's Disclosure of Asserted Claims and Infringement Contentions ("Infringement Contentions"). Defendants provide these Invalidity Contentions despite their objections to Plaintiff's Infringement Contentions. These Invalidity Contentions should not be construed to waive any objections to Plaintiff's Infringement Contentions or as an admission that the Infringement Contentions were adequate or that Plaintiff's apparent claim interpretations are correct, have merit, or should be adopted. Indeed, Plaintiff's Infringement Contentions are deficient and fail to describe the accused functionality and Plaintiff's interpretation of the claim language in a manner that would allow Defendants to fully respond, including in these invalidity contentions. Defendants expressly reserve the right to amend these contentions based on amendments to Plaintiff's Infringement Contentions or when Plaintiff specifies its theories with greater clarity. Additionally, and as further explained below, where these Invalidity Contentions disclose that a prior art reference meets a claim limitation, such position may be based on Plaintiff's apparent claim interpretations in its Infringement Contentions; Defendants do not necessarily agree that such interpretations are correct, have merit, or should be adopted.

Defendants' investigation of the Asserted Patents, their file histories, and the prior art is ongoing, and Defendants expressly reserve the right to supplement these Invalidity Contentions based on further discovery and in a manner consistent with the Federal Rules of Civil Procedure, the Local Patent Rules for the Eastern District of Texas, and any Docket Control Order, or otherwise in accordance with any order or direction of this Court or agreement of the parties. Defendants' ongoing investigation includes, but is not limited to, serving subpoenas on prior artists and inventors regarding prior art, seeking additional information related to the references and prior art systems disclosed in these Invalidity Contentions, seeking additional information regarding Plaintiff's Infringement Contentions and the products and services accused of infringement, and seeking information regarding any prior sales or uses by the original assignees of the Asserted Patents. Defendants also reserve the right to rely on any prior art identified or disclosed by non-parties to this action that are involved in a suit or action involving one or more of the Asserted Patents, as well as any prior art produced or disclosed by Entropic during the course of this litigation. Additionally, Defendants have not yet had the benefit of taking the depositions of the named inventors or those that worked with the named inventors, or of the named inventors, authors, and entities listed on any references or systems identified in these Invalidity Contentions.

## II. ASSERTED PATENTS AND CLAIMS

Plaintiff asserts the following claims from the Asserted Patents (collectively, "the Asserted Claims"):

| Asserted Patent | Asserted Claims |
|---|---|
| '576 patent | 14–23, 34–42 |
| '715 patent | 9–12 |
| '008 patent | 1–5, 7, 9–13, 15, 17, 18 |

Plaintiff asserts a priority date for the '576 and '715 patents of November 7, 2001, and for the '008 patent of September 8, 2011. Reference to an "asserted priority date" should not be construed

to mean that Defendants agree that the Asserted Patents are in fact entitled to such priority dates, or that Plaintiff has provided proper notice as to its contentions for priority dates.

P.R. 3-2(b) requires Plaintiff to produce, contemporaneously with its Disclosure of Asserted Claims and Infringement Contentions," "[a]ll documents evidencing the conception, reduction to practice, design, and development of each claimed invention, which were created on or before the date of application for the patent in suit or the priority date identified pursuant to P.R. 3-1(e), whichever is earlier." Plaintiff did not produce any documents pursuant to P.R. 3-2(b). Defendants thus understand that Plaintiff is not asserting an invention date, or conception, reduction to practice, design, and/or development of the claimed invention, prior to the asserted priority dates identified above. To the extent Plaintiff later properly alleges that any such activities occurred prior to the priority dates identified above, Defendants reserve the right to object to such belated changes in position and/or to supplement these Invalidity Contentions to address any such contention, including by identifying and/or charting additional prior art that may become relevant in view of such assertion. Likewise, to the extent Plaintiff successfully establishes an invention date before any of the prior-art references relied on by Defendants, then those references serve as evidence of secondary considerations of obviousness, particularly, contemporaneous invention by others. To the extent Plaintiff alleges that any prior art relied on in these Invalidity Contentions does not actually qualify as prior art to the Asserted Patent, Defendants reserve the right to rebut those allegations (*e.g.*, by demonstrating an earlier critical date for the challenged prior art and/or a later priority date and/or date of invention for a particular Asserted Claim). Defendants also reserve the right to rely on additional documents, information, and evidence to demonstrate public availability or public availability by a certain date of a prior art reference or to rebut any efforts by Plaintiff to allege any reference was not publicly available or publicly available by a certain date or otherwise available as prior art.

For purposes of these contentions, Defendants address only those claims specifically asserted by Plaintiff. Defendants reserve the right to amend or supplement this disclosure as necessary in view of any changes or amendments made, for any reason, to Plaintiff's infringement theories, infringement contentions, or Asserted Claims, including to Plaintiff's asserted priority and/or invention date(s).

## III. CLAIM CONSTRUCTION

To the extent that these Invalidity Contentions rely on or otherwise embody particular constructions of terms or phrases in the Asserted Claims, Defendants are not conceding that any such constructions are proper. For purposes of these Invalidity Contentions, Defendants may adopt alternative claim construction positions. In particular, portions of these Invalidity Contentions, including the claim charts attached as exhibits, may be based on the underlying claim constructions and/or interpretations in Plaintiff's Infringement Contentions, to the extent such constructions and/or interpretations are understood by Defendants. Defendants do not concede that any such constructions or interpretations by Plaintiff are proper, and expressly reserve the right to contest any such constructions.

Throughout the attached Exhibits, Defendants provide examples of where references disclose subject matter recited in preambles, without regard to whether the preambles are properly considered to be limitations of the Asserted Claims. Defendants reserve the right to argue, at the appropriate stage of this case, that the preambles are or are not limitations. Further, the fact that Defendants provide examples of any limitation does not mean that Defendants believe that the limitation is defined, or otherwise enabled, or comports with the requirements of the patent statute, including, but not limited to, 35 U.S.C. § 112.

Nothing disclosed herein is an admission or acknowledgement that any of Defendants' products or services infringes any of the Asserted Claims. Defendants reserve the right to

supplement, modify, or otherwise amend these Invalidity Contentions, including based on the Court's claim construction rulings or opinions or the parties' positions or arguments taken in connection with the claim construction process. Moreover, Defendants reserve the right to rely on any disclosures in the accompanying P.R. 3-4(b) production as it believes necessary in view of positions Plaintiff may take with respect to the scope and meaning of the Asserted Claims.

## IV. P.R. 3-3(a) – IDENTIFICATION OF PRIOR ART[1]

### A. '576 Patent

#### 1. Prior Art Patents

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| 3,051,938 | United States | August 28, 1962 |
| 4,109,281 | United States | August 22, 1978 |
| 4,864,613 | United States | September 5, 1989 |
| 5,073,930 | United States | December 19, 1991 |
| 5,173,775 | United States | December 22, 1991 |
| 5,103,459 | United States | April 7, 1992 |
| 5,150,247 | United States | September 22, 1992 |
| 5,206,954 | United States | April 27, 1993 |
| JPH05316062A | Japan | November 26, 1993 |
| 5,276,904 | United States | January 4, 1994 |
| WO 1996008892 | United States | March 21, 1996 |
| EP 0740434 A1 | Spain / Germany | April 29, 1996 |
| 5,585,850 | United States | December 17, 1996 |
| 5,588,022 | United States | December 24, 1996 |
| 5,724,091 | United States | March 3, 1998 |
| KR0142730B1 | South Korea | April 3, 1998 |

[1] Defendants also hereby identify any systems or products that embody the technology described in any patent or publication identified in these Invalidity Contentions. Defendants reserve the right to rely on any documents or other evidence regarding any such systems.

[2] The dates in this column are the latest dates on which the patents or publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| EP 0899951 A1 | France | August 24, 1998 |
| 5,883,661 | United States | March 16, 1999 |
| 5,936,660 | United States | August 10, 1999 |
| JP PAT APP 11243495 A (MAT) | Japan | September 7, 1999 |
| 5,959,592 | United States | September 28, 1999 |
| 5,970,386 | United States | October 19, 1999 |
| JPH11317715A | Japan | November 16, 1999 |
| EP 1071286 A1 | Japan | January 11, 2000 |
| WO 2000003542 A1 | Italy | January 20, 2000 |
| 6,078,783 | United States | June 20, 2000 (Filed September 30, 1997) |
| 6,122,482 | United States | September 19, 2000 |
| 6,134,419 | United States | October 17, 2000 |
| WO 2000067401 A2 | United States | November 9, 2000 |
| WO 2001/05156 A1 | United States | January 18, 2001 (Filed July 7, 2000; Priority to July 8, 1999) |
| JP2001128138 | Japan | May 11, 2001 |
| CA 2416790 A1 | Canada | February 7, 2002 (Filed July 30, 2001; Priority to August 1, 2000) |
| 2002/0038458 | United States | March 28, 2002 (Filed March 13, 2001; Priority to April 8, 1998) |
| 6,378,000 | United States | April 23, 2002 (Filed April 29, 1999) |
| JP2002135745 | Japan | May 10, 2002 |
| 2002/0066102 | United States | May 30, 2002 (Filed November 29, 2000) |
| 6,430,233 | United States | August 6, 2002 (Filed August 30, 1999) |
| 6,430,742 | United States | August 6, 2002 (Filed August 11, 1998) |
| 2002/0116714 | United States | August 22, 2002 (Filed February 12, 2002) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| 2002/0154055 | United States | October 24, 2002 (Filed April 15, 2002; Priority to April 18, 2001) |
| 6,480,551 | United States | November 12, 2002 (Filed November 17, 1998) |
| 6,486,907 | United States | November 26, 2002 (Filed July 23, 1997) |
| 6,493,873 | United States | December 10, 2002 (Filed January 20, 1998; Priority to January 27, 1997) |
| 6,501,423 | United States | December 31, 2002 (Filed May 6, 2002; Priority to April 14, 2000) |
| 2003/0043260 | United States | March 6, 2003 (Filed January 9, 2002; Priority to August 29, 2001) |
| 6,600,730 | United States | July 29, 2003 (Filed August 20, 1998) |
| 2003/0165200 | United States | September 4, 2003 (Filed August 30, 2001) |
| 6,622,307 | United States | September 16, 2003 (Filed March 26, 1999) |
| 6,678,737 | United States | January 13, 2004 (Filed April 28, 2000) |
| 6,697,603 | United States | February 24, 2004 (Filed December 13, 1999) |
| 6,704,372 | United States | March 9, 2004 (Filed September 18, 2001) |
| 6,738,434 | United States | May 18, 2004 (Filed August 28, 2002; Priority to July 1, 1999) |
| 6,745,392 | United States | June 1, 2004 (Filed September 8, 1999) |
| 6,888,888 | United States | May 3, 2005 (Filed June 26, 2001) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| 6,950,009 | United States | September 27, 2005 (Filed June 17, 2003; Priority to November 29, 1996) |
| 6,816,485 | United States | November 9, 2004 (Filed October 17, 2002) |
| 6,970,717 | United States | November 29, 2005 (Filed February 12, 2002; Priority to January 12, 2001) |
| 7,099,951 | United States | August 29, 2006 (Filed May 24, 2001) |
| 7,123,649 | United States | October 17, 2006 (Filed November 3, 2000) |
| 7,200,377 | United States | April 3, 2007 (Filed June 6, 2001) |
| 7,215,679 | United States | May 8, 2007 (Filed August 30, 2001) |
| EP PAT 1301030 B1 | France | June 13, 2007 (Filed August 7, 2002; Priority to August 30, 2001) |
| 7,257,132 | United States | August 14, 2007 (Filed February 5, 1999) |
| 7,263,713 | United States | August 28, 2007 (Filed February 26, 2001; Priority to March 1, 2000) |
| 7,299,485 | United States | November 20, 2007 (Filed June 23, 2006; Priority to December 23, 1994) |
| 7,301,900 | United States | November 27, 2007 (Filed May 24, 2001) |
| 7,346,918 | United States | March 18, 2008 (Filed December 27, 2000) |
| 7,353,004 | United States | April 1, 2008 (Filed June 14, 2002; Priority to November 1, 2001) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[2] |
|---|---|---|
| 7,359,447 | United States | April 15, 2008 (Filed February 3, 2003; Priority to February 19, 2002) |
| 7,376,387 | United States | June 20, 2008 (Filed December 28, 1999) |
| 7,954,127 | United States | May 31, 2011 (Filed September 25, 2002) |

**2. Prior Art Publications**

| Title, Author(s), and Publisher | Date of Publication[3] |
|---|---|
| Communication Systems (4th ed.), A. Bruce Carlson et al., McGraw-Hill Higher Education | 2002 |
| Digital Communication Systems Design, Martin S. Roden, Prentice-Hall, Inc. Englewood Cliffs, New Jersey | 1988 |
| Direct Broadcast Satellite Communications: An MPEG Enabled Service, Donald C. Mead, Prentice-Hall, Inc., Upper Saddle River, New Jersey | 2000 |
| TR 101 201 v.1.1.1 (1997-10) Technical Report: Digital Video broadcasting (DVB); Interaction channel for Satellite Master Antenna TR (SMATV) distribution systems; Guidelines for versions based on satellite and coaxial sections, European Telecommunications Standards Institute / European Broadcasting Union | 1997 |
| ETSI 01 699 V1.1.1 Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification, European Telecommunications Standards Institute and European Broadcasting Union | 1999 |
| EN 300 473 v1.1.2 (1997-08) European Standard: Digital Video broadcasting (DVB); Satellite Master Antenna Television (SMATV) distribution systems, European Telecommunications Standards Institute / European Broadcasting Union | 1997 |
| Satellite Communications, 3d ed., Dennis Roddy, McGraw-Hill | 2001 |
| The Equivalence of Digital and Analog Signal Processing, K. Steiglitz, Information and Control | 1965 |
| DVB CPT rev 1.2; DVB Technical Module Sub-Group On Copy Protection Technologies: Digital Video Broadcasting Call For Proposals for Content Protection & Copy Management Technologies | 2001 |

[3] The dates in this column are the latest dates on which the publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Title, Author(s), and Publisher | Date of Publication[3] |
|---|---|
| EN 50221; Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications | 1997 |
| Enhancing TCP Over Satellite Channels Using Standard Mechanisms, Allman, et al., Best Current Practice | 1999 |
| ETS 300 473; Digital Broadcasting systems for television sound and data services; Satellite Master Antenna Television (SMATV) distribution systems: European Telecommunication Standard | 1995 |
| Digital Transmission Content Protection Specification Volume 1; Revision 1.2 (Information Version) | 2001 |

## B. '715 Patent

### 1. Prior Art Patents

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 3,051,938 | United States | August 28, 1962 |
| 4,109,281 | United States | August 22, 1978 |
| 4,864,613 | United States | September 5, 1989 |
| 5,073,930 | United States | December 19, 1991 |
| 5,173,775 | United States | December 22, 1991 |
| 5,103,459 | United States | April 7, 1992 |
| 5,150,247 | United States | September 22, 1992 |
| 5,206,954 | United States | April 27, 1993 |
| JPH05316062A | Japan | November 26, 1993 |
| 5,276,904 | United States | January 4, 1994 |
| WO 1996008892 | United States | March 21, 1996 |
| EP 0740434 A1 | Spain / Germany | April 29, 1996 |
| 5,585,850 | United States | December 17, 1996 |
| 5,588,022 | United States | December 24, 1996 |
| 5,724,091 | United States | March 3, 1998 |
| KR0142730B1 | South Korea | April 3, 1998 |
| EP 0899951 A1 | France | August 24, 1998 |
| 5,883,661 | United States | March 16, 1999 |

[4] The dates in this column are the latest dates on which the patents or publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 5,936,660 | United States | August 10, 1999 |
| JP PAT APP 11243495 A | Japan | September 7, 1999 |
| 5,959,592 | United States | September 28, 1999 |
| 5,970,386 | United States | October 19, 1999 |
| JPH11317715A | Japan | November 16, 1999 |
| 6,005,861 | United States | December 21, 1999 |
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| 6,078,783 | United States | June 20, 2000 (Filed September 30, 1997) |
| WO 2000/004707 A1 | United States | January 27, 2000 |
| 6,122,482 | United States | September 19, 2000 |
| 6,134,419 | United States | October 17, 2000 |
| WO 2000067401 A2 | United States | November 9, 2000 |
| WO 2001/05156 A1 | United States | January 18, 2001 (Filed July 7, 2000; Priority to July 8, 1999) |
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| CA 2416790 A1 | Canada | February 7, 2002 (Filed July 30, 2001; Priority to August 1, 2000) |
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| 6,378,000 | United States | April 23, 2002 (Filed April 29, 1999) |
| 2002/0056140 | United States | May 9, 2002 (Filed February 26, 201; Priority to March 1, 2000) |
| JP2002135745 | Japan | May 10, 2002 |
| 2002/0066102 | United States | May 30, 2002 (Filed November 29, 2000) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 6,430,233 | United States | August 6, 2002 (Filed August 30, 1999) |
| 6,430,742 | United States | August 6, 2002 (Filed August 11, 1998) |
| 2002/0116714 | United States | August 22, 2002 (Filed February 12, 2002) |
| 2002/0154055 | United States | October 24, 2002 (Filed April 15, 2002; Priority to April 18, 2001) |
| 6,480,551 | United States | November 12, 2002 (Filed November 17, 1998) |
| 6,486,907 | United States | November 26, 2002 (Filed July 23, 1997) |
| 6,493,873 | United States | December 10, 2002 (Filed January 20, 1998; Priority to January 27, 1997) |
| 6,501,423 | United States | December 31, 2002 (Filed May 6, 2002; Priority to April 14, 2000) |
| 2003/0043260 | United States | March 6, 2003 (Filed January 9, 2002; Priority to August 29, 2001) |
| 2003/0140345 | United States | July 24, 2003 (Filed February 9, 2001) |
| 6,600,730 | United States | July 29, 2003 (Filed August 20, 1998) |
| 2003/0165200 | United States | September 4, 2003 (Filed August 30, 2001) |
| 6,622,307 | United States | September 16, 2003 (Filed March 26, 1999) |
| 6,678,737 | United States | January 13, 2004 (Filed April 28, 2000) |
| 6,697,603 | United States | February 24, 2004 (Filed December 13, 1999) |
| 6,704,372 | United States | March 9, 2004 (Filed Sep. 18, 2001) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 6,738,434 | United States | May 18, 2004 (Filed August 28, 2002; Priority to July 1, 1999) |
| 6,745,392 | United States | June 1, 2004 (Filed September 8,1999) |
| 6,816,485 | United States | November 9, 2004 (Filed Oct. 17, 2002) |
| 2004/0250273 | United States | December 9, 2004 (Filed December 14, 2001; Priority to April 2, 2001) |
| 6,889,385 | United States | March 3, 2005 (Filed June 23, 2000; Priority to January 14, 2000) |
| 6,888,888 | United States | May 3, 2005 (Filed June 26, 2001) |
| 6,950,009 | United States | September 27, 2005 (Filed June 17, 2003; Priority to November 29, 1996) |
| 6,965,593 | United States | November 15, 2005 (Filed March 4, 2002); Priority to September 2, 1997) |
| 6,970,717 | United States | November 29, 2005 (Filed February 12, 2002; Priority to January 12, 2001) |
| 7,099,951 | United States | August 29, 2006 (Filed May 24, 2001) |
| 7,123,649 | United States | October 17, 2006 (Filed November 3, 2000) |
| 7,155,734 | United States | December 26, 2006 (Filed February 29, 2000; Priority to April 16, 1999) |
| 7,200,377 | United States | April 3, 2007 (Filed June 6, 2001) |
| 7,200,855 | United States | April 3, 2007 (Filed May 24, 2001) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[4] |
|---|---|---|
| 7,215,679 | United States | May 8, 2007 (Filed August 30, 2001) |
| EP PAT 1301030 B1 | France | June 13, 2007 (Filed August 7, 2002; Priority to August 30, 2001) |
| 7,257,132 | United States | August 14, 2007 (Filed February 5, 1999) |
| 7,263,713 | United States | August 28, 2007 (Filed February 26, 2001; Priority to March 1, 2000) |
| 7,299,485 | United States | November 20, 2007 (Filed June 23, 2006; Priority to December 23, 1994) |
| 7,301,900 | United States | November 27, 2007 (Filed May 24, 2001) |
| 7,346,918 | United States | March 18, 2008 (Filed December 27, 2000) |
| 7,353,004 | United States | April 1, 2008 (Filed June 14, 2002; Priority to November 1, 2001) |
| 7,359,447 | United States | April 15, 2008 (Filed February 3, 2003; Priority to February 19, 2002) |
| 7,376,387 | United States | June 20, 2008 (Filed December 28, 1999) |
| 7,954,127 | United States | May 31, 2011 (Filed September 25, 2002) |
| 2013/0149958 | United States | June 13, 2013 (Filed February 13, 2013; Priority to April 18, 2001) |
| 8,601,519 | United States | December 3, 2013 (Filed December 28, 2000) |

## 2. Prior Art Publications

| Title, Author(s), and Publisher | Date of Publication [5] |
|---|---|
| Communication Systems (4th ed.), A. Bruce Carlson et al., McGraw-Hill Higher Education | 2002 |
| Digital Communication Systems Design, Martin S. Roden, Prentice-Hall, Inc. Englewood Cliffs, New Jersey | 1988 |
| Direct Broadcast Satellite Communications: An MPEG Enabled Service, Donald C. Mead, Prentice-Hall, Inc., Upper Saddle River, New Jersey | 2000 |
| TR 101 201 v.1.1.1 (1997-10) Technical Report: Digital Video broadcasting (DVB); Interaction channel for Satellite Master Antenna TR (SMATV) distribution systems; Guidelines for versions based on satellite and coaxial sections, European Telecommunications Standards Institute / European Broadcasting Union | 1997 |
| ETSI TS 101 699 V1.1.1 Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification, European Telecommunications Standards Institute and European Broadcasting Union | 1999 |
| EN 300 473 v1.1.2 (1997-08) European Standard: Digital Video broadcasting (DVB); Satellite Master Antenna Television (SMATV) distribution systems, European Telecommunications Standards Institute / European Broadcasting Union | 1997 |
| Satellite Communications, 3d ed., Dennis Roddy, McGraw-Hill | 2001 |
| Television Goes Digital, Darcy Gerbarg (ed), Springer Science + Business Media LLC | 2009 |
| The Equivalence of Digital and Analog Signal Processing, K. Steiglitz, Information and Control | 1965 |
| DVB CPT rev 1.2; DVB Technical Module Sub-Group On Copy Protection Technologies: Digital Video Broadcasting Call For Proposals for Content Protection & Copy Management Technologies | 2001 |
| EN 50221; Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications | 1997 |
| Enhancing TCP Over Satellite Channels Using Standard Mechanisms, Allman, et al., Best Current Practice | 1999 |
| ETS 300 473; Digital Broadcasting systems for television sound and data services; Satellite Master Antenna Television (SMATV) distribution systems: European Telecommunication Standard | 1995 |

[5] The dates in this column are the latest dates on which the publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Title, Author(s), and Publisher | Date of Publication[5] |
|---|---|
| Digital Transmission Content Protection Specification Volume 1; Revision 1.2 (Information Version) | 2001 |

## C. '008 Patent

### 1. Prior Art Patents

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[6] |
|---|---|---|
| 5,263,182 | United States | November 16, 1993 |
| 5,535,240 | United States | July 9, 1996 |
| 5,630,227 | United States | May 13, 1997 |
| 5,675,371 | United States | October 7, 1997 |
| 5,808,671 | United States | September 15, 1998 |
| 5,874,992 | United States | February 23, 1999 |
| 6,002,422 | United States | December 14, 1999 |
| 6,031,878 | United States | February 29, 2000 |
| 6,278,493 | United States | August 21, 2001 |
| CN2471036Y | China | January 9, 2002 |
| 6,356,539 | United States | March 12, 2002 |
| 6,445,907 | United States | September 3, 2002 |
| 6,631,255 | United States | October 7, 2003 |
| 6,704,372 | United States | March 9, 2004 |
| 2004/0093370 | United States | May 13, 2004 |
| 2004/0117834 | United States | June 17, 2004 |
| 2005/0114879 | United States | May 26, 2005 |
| 2005/0190777 | United States | September 1, 2005 |
| 7,010,265 | United States | March 7, 2006 |
| 7,027,520 | United States | April 11, 2006 |
| 7,116,958 | United States | October 3, 2006 |
| 7,149,470 | United States | December 12, 2006 |
| 2007/0286311 | United States | December 13, 2007 |
| 2008/0046947 | United States | February 21, 2008 |

[6] The dates in this column are the latest dates on which the patents or publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[6] |
|---|---|---|
| 2008/0168520 | United States | July 10, 2008 |
| 7,403,486 | United States | July 22, 2008 |
| 2008/0240229 | United States | October 2, 2008 |
| 7,489,641 | United States | February 10, 2009 |
| CN102164304A | China | April 8, 2009 |
| 7,558,551 | United States | July 7, 2009 |
| 7,573,398 | United States | August 11, 2009 |
| 2009/0290602 | United States | November 26, 2009 |
| 7,739,717 | United States | June 15, 2010 |
| 7,788,684 | United States | August 31, 2010 |
| CN101404782A | China | February 23, 2011 |
| 7,924,348 | United States | April 12, 2011 |
| 2011/0176060 | United States | July 21, 2011 |
| 8,077,760 | United States | December 13, 2011 (Filed November 6, 2008) |
| 8,126,044 | United States | February 28, 2012 (Filed Oct. 25, 2006) |
| 8,175,191 | United States | May 8, 2012 (Filed February 20, 2008) |
| 2012/0278826 | United States | November 1, 2012 (Filed April 27, 2011) |
| 8,345,798 | United States | January 1, 2013 (Filed March 31, 2009) |
| 8,352,995 | United States | January 8, 2013 (Filed January 7, 2011) |
| 8,364,107 | United States | January 29, 2013 (Filed Sep. 15, 2010) |
| 2013/0091528 | United States | April 11, 2013 (Filed May 23, 2011) |
| 8,424,049 | United States | April 16, 2013 (Filed August 25, 2006) |
| 8,472,562 | United States | June 25, 2013 (Priority to March 31, 2003) |
| 8,494,091 | United States | July 23, 2013 (Filed May 30, 2012) |
| 8,582,694 | United States | November 12, 2013 (Filed April 24, 2012) |

| Patent / Publication No. | Country of Origin | Date of Issue /Publication[6] |
|---|---|---|
| 8,649,421 | United States | February 11, 2014 (Filed February 17, 2012; Priority to February 18, 2011) |
| 8,848,110 | United States | September 30, 2014 (Filed May 28, 2010) |
| 8,891,699 | United States | November 18, 2014 (Filed March 23, 2012; Priority to March 25, 2011) |
| 8,897,147 | United States | November 25, 2014 (Priority to March 25, 2011) |
| 8,948,316 | United States | February 3, 2015 (Filed March 23, 2012; Priority to March 25, 2011) |
| 9,071,397 | United States | June 30, 2015 (Filed March 23, 2012; Priority to March 25, 2011) |
| 9,130,790 | United States | September 8, 2015 (Filed March 23, 2012; Priority to March 25, 2011) |
| 9,252,917 | United States | February 2, 2016 (Filed March 23, 2012; Priority to March 25, 2011) |
| 9,338,488 | United States | May 10, 2016 (Field April 6, 2011) |
| 9,344,262 | United States | May 17, 2016 (Filed January 20, 2012; Priority to January 21, 2011) |
| 9,485,010 | United States | November 1, 2016 (Filed March 16, 2006) |
| 9,686,594 | United States | June 20, 2017 (Filed March 30, 2012; Priority to November 11, 2011) |

## 2. Prior Art Publications

| Title, Author(s), and Publisher | Date of Publication [7] |
|---|---|
| Communication Systems (4th ed.), A. Bruce Carlson et al., McGraw-Hill Higher Education | 2002 |
| Data Communications and Networking, Behrouz A. Forouzan | September 30, 2003 |
| DOCSIS Best Practices and Guidelines: Cable Modem Buffer Control CM-GL-Buffer-V01-110915, CableLabs | September 15, 2011 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: MAC and Upper Layer Protocols Interface Specification - CM-SP-MULPIv3.0-I16-110623, Cable Television Laboratories, Inc. | June 23, 2011 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: Operations Support System Interface Specification - CM-SP-OSSI3.0-I05-071206, Cable Television Laboratories, Inc. | December 6, 2007 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: Operations Support System Interface Specification - CM-SP-OSSIv3.0-I15-110623, Cable Television Laboratories, Inc. | June 23, 2011 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: Physical Layer Specification - CM-SP-PHYv3.0-I09-101008, Cable Television Laboratories, Inc. | October 8, 2010 |
| Data-Over-Cable Service Interface Specifications DOCSIS 3.0: Security Specification - CM-SP-SECv3.0-I13-100611, Cable Television Laboratories, Inc. | June 11, 2010 |
| Digital Satellite Equipment Control (DiSEqC) Application Information for LNBs and Switchers | February 25, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Applications Information for Using a "PIC" Microcontroller | June 1, 1999 |
| Digital Satellite Equipment Control (DiSEqC) Applications Information for Tuner-Receiver/IRDs | April 12, 1996 |
| Digital Satellite Equipment Control (DiSEqC) Bus Functional Specification | February 25, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Logos and Conditions of Use | February 25, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Positioner Application Note | March 15, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Reset Circuits for the Slave Microcontroller | August 12, 1996 |

[7] The dates in this column are the latest dates on which the publications were publicly available. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

| Title, Author(s), and Publisher | Date of Publication[7] |
|---|---|
| Digital Satellite Equipment Control (DiSEqC) Simple "ToneBurst" Detection Circuit | August 12, 1996 |
| Digital Satellite Equipment Control (DiSEqC) Slave Microcontroller | February 25, 1998 |
| Digital Satellite Equipment Control (DiSEqC) Update and Recommendations for Implementation | February 25, 1998 |
| DVB-S2: The Second Generation Standard for Satellite Broad-band Services, Alberto Morello and Vittoria Mignone | January 2006 |
| Effects of Rain Attenuation on Satellite Video Transmission, Yee Hui Lee and Stefan Winkler | May 2011 |
| ETSI EN 301 790 v1.5.1 (2009-05) European Standard: Digital Video Broadcasting (DVB); Interaction channel for satellite distribution systems, European Telecommunications Standards Institute and European Broadcasting Union | 2009 |
| Final Draft ETSI EN 302 307 v1.2.1 (2009-04) European Standard: Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2), European Telecommunications Standards Institute and European Broadcasting Union | 2009 |
| ETSI ER 101 790 V1.4.1 European Standard: Digital Video Broadcasting (DVB); Interaction channel for Satellite Distribution Systems; Guidelines for the use of EN 301 790, European Telecommunications Standards Institute and European Broadcasting Union | 2009 |
| ETSI TR 101 290 V1.2.1 Digital Video Broadcasting (DVB); Measurement guidelines for DVB systems, European Telecommunications Standards Institute and European Broadcasting Union | 2001 |
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| Title, Author(s), and Publisher | Date of Publication[7] |
|---|---|
| ETSI TS 101 699 V1.1.1 Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification, European Telecommunications Standards Institute and European Broadcasting Union | 1999 |
| An HDTV Broadcasting System Utilizing a Bandwidth Compression Technique - MUSE, Yuichi Ninomiya, et al. | December 1987 |
| Handbook on Satellite Communications (HSC) (Edition 3), International Telecommunication Union - Radio Communication Sector (ITU-R) | 2002 |
| Recommendation ITU-R BO.1294 (BO.1294) | 1997 |
| Recommendation ITU-R BO.1516 (BO.1516) | 2001 |
| Recommendation ITU-R S.1878 (S.1878) | 2010 |
| Migration to Full Digital Channel Loading on a Cable System, Marc Ryba, Motorola Broadband Communications Sector | 2001 |
| Modern Cable Television (2d ed.), Walter Ciciora et al. | 2004 |
| Handbook: Spectrum Monitoring, International Telecommunication Union - Radio Communication Sector (ITU-R) | 2011 |
| Satellite Direct-to-Home, Stephen Dulac and John Godwin | January 2006 |
| The Equivalence of Digital and Analog Signal Processing, K. Steiglitz, Information and Control | 1965 |

### 3. Prior Art Sales/Public Uses

| Item Offered for Sale and/or Publicly Used or Known | Date of Offer / Public Use / Knowledge[8] | Person or Entity Who Made and Received Offer, Made Public Use, or Made Information Known or to Whom Made Known |
|---|---|---|
| Full Band Capture Chip BCM3124/BCM3128 | On or before June 13, 2011 | Broadcom to general public |
| Full Band Capture Chip BCM4528 | On or before September 5, 2011 | Broadcom to general public |
| Super Buddy Satellite Meter | On or before December 2009 | Applied Instruments, Inc. to general public |

[8] The dates in this column are the latest dates on which the systems were publicly used or known. Defendants reserve the right to identify earlier dates should such dates be ascertained through discovery.

## V. PRIMARY REFERENCES

The primary prior art references that Defendants rely on for the Asserted Patents are identified below. The exhibits to these Invalidity Contentions contain claim charts for the primary prior art references. Obviousness combinations of the primary prior art references are separately identified throughout these Invalidity Contentions (including below and in Appendices A–C).

Defendants' reliance on each prior art reference identified throughout these Invalidity Contentions (whether primary references or obviousness references) includes the reference itself, anything incorporated by the reference, any system embodying the reference, and any testimony by those with knowledge of the reference, such as named authors and inventors..[9] All such documents and information shall be considered one prior art reference to the extent they describe a single prior art system or solution, or the closely related work of a single prior art author. In addition to the specific references below, Defendants reserve the right to rely on all admitted prior art in the Asserted Patents and their file histories, as well as anything admitted by prior art by Plaintiff or its experts or representatives. Defendants reserve the right to supplement these Invalidity Contentions as discovery reveals further information about prior use and/or prior public knowledge of products, methods, or systems that Defendants have reason to believe anticipate or render obvious one or more of the Asserted Claims. Defendants further reserve the right to identify and rely on additional prior art in Plaintiff's possession, custody, or control that has not yet been produced or identified to Defendants.

[9] For example, for each patent identified as a prior art reference in these Invalidity Contentions, Defendants reserve the right to rely on the patent itself and/or any system that practices or embodies the patent to demonstrate invalidity.

## A. '576 Patent

The following primary references, alone or in combination with any other reference identified in this subsection or the references identified in Appendix A, render invalid one or more of the Asserted Claims of the '576 patent.

### 1. International Patent Publication No. WO 00/03542 ("Ardemagni")

Ardemagni was filed on June 18, 1999, and published on January 20, 2000. Ardemagni qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and/or (b). Ardemagni anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A1 provides representative, non-limiting examples of where Ardemagni discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Ardemagni does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Ardemagni alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Ardemagni with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### 2. U.S. Patent No. 6,745,392 ("Basawapatna")

Basawapatna was filed on September 8, 1999, and issued on June 1, 2004. Basawapatna qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and (e). Basawapatna anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A2 provides representative, non-limiting examples of where Basawapatna discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that

Basawapatna does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Basawapatna alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Basawapatna with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**3. European Patent Application EP 0 740 434 ("Carnero")**

Carnero published on October 30, 1997. Carnero qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and (b). Carnero anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A3 provides representative, non-limiting examples of where Carnero discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Carnero does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Carnero alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Carnero with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**4. U.S. Patent Publication No. 2002/0154,055 ("Davis '055")**

Davis '055 published on October 24, 2002, and claims priority to U.S. Provisional Patent App. No. 28/459301, which was filed on April 18, 2001. Davis '055 qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Davis '055 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the

'576 patent. The claim chart attached as Exhibit A4 provides representative, non-limiting examples of where Davis '055 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Davis '055 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Davis '055 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Davis '055 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**5. U.S. Patent No. 6,600,730 ("Davis '730")**

Davis '730 was filed on August 20, 1998, and issued on July 29, 2003. Davis '730 qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Davis '730 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A5 provides representative, non-limiting examples of where Davis '730 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Davis '730 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Davis '730 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Davis '730 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### 6. International Patent Publication No. WO 00/67401 ("Gregoire")

Gregoire was filed as PCT No. US00/12401 on May 4, 2000, and published on November 9, 2000. Gregoire qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and/or (e). Gregoire anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A6 provides representative, non-limiting examples of where Gregoire discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Gregoire does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Gregoire alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Gregoire with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### 7. European Patent Application EP 1 071 286 ("Inose")

Inose published on July 20, 2000. Inose qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and (b). Inose anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A7 provides representative, non-limiting examples of where Inose discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Inose does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Inose alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Inose with concepts from other prior art, including any of the other primary references or the references identified in Appendix A

or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**8. U.S. Patent No. 7,954,127 ("James")**

James was filed on September 25, 2002, and issued on May 31, 2011. James qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). James anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A8 provides representative, non-limiting examples of where James discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that James does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of James alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify James with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**9. Korean Patent Application No. 0142730 ("Kang")**

Kang published on November 25, 1996. Kang qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a) and (b). Kang anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A9 provides representative, non-limiting examples of where Kang discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Kang does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Kang alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Kang with concepts from other

prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**10. U.S. Patent No. 6,697,603 ("Lovinggood")**

Lovinggood was filed on December 19, 1999, and issued on February 24, 2004. Lovinggood qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Lovinggood anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A10 provides representative, non-limiting examples of where Lovinggood discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Lovinggood does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Lovinggood alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Lovinggood with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**11. U.S. Patent No. 5,276,904 ("Mutzig")**

Mutzig issued on January 4, 1994. Mutzig qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Mutzig anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A11 provides representative, non-limiting examples of where Mutzig discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Mutzig does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Mutzig alone and/or in view of

the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Mutzig with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**12. U.S. Patent No. 5,959,592 ("Petruzzelli")**

Petruzzelli issued on September 29, 1999. Petruzzelli qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Petruzzelli anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A12 provides representative, non-limiting examples of where Petruzzelli discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Petruzzelli does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Petruzzelli alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Petruzzelli with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**13. U.S. Patent Publication No. 2003/0165200 ("Pugel '200")**

Pugel '200 was filed on August 30, 2001, and published on September 4, 2003. Pugel '200 qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Pugel '200 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A13 provides representative, non-limiting examples of where Pugel '200 discloses, either expressly or

inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Pugel '200 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Pugel '200 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Pugel '200 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**14. U.S. Patent No. 6,134,419 ("Williams '419")**

Williams '419 issued on October 17, 2000. Williams '419 qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Williams '419 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '576 patent. The claim chart attached as Exhibit A14 provides representative, non-limiting examples of where Williams '419 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Williams '419 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Williams '419 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Williams '419 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**15. U.S. Patent No. 6,493,873 ("Williams '873")**

Williams '873 was filed on January 20, 1998, and issued on December 10, 2002. Williams '873 qualifies as prior art to the '576 patent under at least 35 U.S.C. § 102(e). Williams '873 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary

skill in the art) all Asserted Claims of the '873 patent. The claim chart attached as Exhibit A15 provides representative, non-limiting examples of where Williams '873 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Williams '873 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Williams '873 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Williams '873 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**B. '715 Patent**

The following primary references, alone or in combination with any other reference identified in this subsection or the references identified in Appendix A, render invalid one or more of the Asserted Claims of the '715 patent.

**1. International Patent Publication No. WO 00/03542 ("Ardemagni")**

Ardemagni was filed on June 18, 1999, and published on January 20, 2000. Ardemagni qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a) and/or (b). Ardemagni anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B1 provides representative, non-limiting examples of where Ardemagni discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Ardemagni does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Ardemagni alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Ardemagni with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or

Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**2. European Patent Application EP 0 740 434 ("Carnero")**

Carnero published on October 30, 1997. Carnero qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a) and (b). Carnero anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B2 provides representative, non-limiting examples of where Carnero discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Carnero does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Carnero alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Carnero with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**3. U.S. Patent Publication No. 2002/0154,055 ("Davis '055")**

Davis '055 published on October 24, 2002, and claims priority to U.S. Provisional Patent App. No. 28/459301, which was filed on April 18, 2001. Davis '055 qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Davis '055 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B3 provides representative, non-limiting examples of where Davis '055 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Davis '055 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Davis '055 alone and/or in view

of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Davis '055 with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**4. U.S. Patent No. 6,600,730 ("Davis '730")**

Davis '730 was filed on August 20, 1998, and issued on July 29, 2003. Davis '730 qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Davis '730 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B4 provides representative, non-limiting examples of where Davis '730 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Davis '730 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Davis '730 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Davis '730 with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**5. International Patent Publication No. WO 02/065771 ("Fisk")**

Fisk has an international filing date of February 9, 2001, and published on August 22, 2002. Fisk published in the English language and designates the United States. Fisk qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Fisk anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B5 provides representative, non-limiting

examples of where Fisk discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Fisk does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Fisk alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Fisk with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**6. International Patent Publication No. WO 00/67401 ("Gregoire")**

Gregoire was filed as PCT No. US00/12401 on May 4, 2000, and published on November 9, 2000. Gregoire qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a) and/or (e). Gregoire anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B6 provides representative, non-limiting examples of where Gregoire discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Gregoire does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Gregoire alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Gregoire with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**7. U.S. Patent No. 8,601,519 ("Hicks")**

Hicks was filed on December 28, 2000, and issued on December 3, 2013. Hicks qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Hicks anticipates and/or renders

obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B7 provides representative, non-limiting examples of where Hicks discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Hicks does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Hicks alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Hicks with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**8. Korean Patent Application No. 0142730 ("Kang")**

Kang published on November 25, 1996. Kang qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a) and (b). Kang anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B8 provides representative, non-limiting examples of where Kang discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Kang does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Kang alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Kang with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**9. U.S. Patent No. 5,276,904 ("Mutzig")**

Mutzig issued on January 4, 1994. Mutzig qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Mutzig anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B9 provides representative, non-limiting examples of where Mutzig discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Mutzig does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Mutzig alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Mutzig with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**10. U.S. Patent No. 7,263,713 ("Oishi")**

Oishi was filed on February 26, 2001, and issued on May 9, 2002. Oishi qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Oishi anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B10 provides representative, non-limiting examples of where Oishi discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Oishi does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Oishi alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Oishi with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in

view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**11. U.S. Patent No. 5,959,592 ("Petruzzelli")**

Petruzzelli issued on September 28, 1999. Petruzzelli qualifies as prior art to the '715 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Petruzzelli anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B11 provides representative, non-limiting examples of where Petruzzelli discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Petruzzelli does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Petruzzelli alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Petruzzelli with concepts from other prior art, including any of the other primary references or the references identified in Appendix B or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**12. U.S. Patent No. 6,134,419 ("Williams '419")**

Williams '419 issued on October 17, 2000. Williams '419 qualifies as prior art to the '576 patent under at least 35 U.S.C. §§ 102(a), (b) and/or (e). Williams '419 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B12 provides representative, non-limiting examples of where Williams '419 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Williams '419 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Williams '419 alone and/or in view of the knowledge of one of ordinary skill in the art,

and it would have been obvious to combine or modify Williams '419 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**13. U.S. Patent No. 6,493,873 ("Williams '873")**

Williams '873 was filed on January 20, 1998, and issued on December 10, 2002. Williams '873 qualifies as prior art to the '715 patent under at least 35 U.S.C. § 102(e). Williams '873 anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '715 patent. The claim chart attached as Exhibit B13 provides representative, non-limiting examples of where Williams '873 discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Williams '873 does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Williams '873 alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Williams '873 with concepts from other prior art, including any of the other primary references or the references identified in Appendix A or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**C. '008 Patent**

The following primary references, alone or in combination with any other reference identified in this subsection or the references identified in Appendix A, render invalid one or more of the Asserted Claims of the '008 patent.

**1. U.S. Patent Publication No. 2007/0286311 ("Coyne")**

Coyne was filed on May 1, 2007, and published on December 13, 2007. Coyne qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Coyne anticipates

and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C1 provides representative, non-limiting examples of where Coyne discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Coyne does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Coyne alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Coyne with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**2. U.S. Patent No. 5,808,671 ("Maycock")**

Maycock issued on September 15, 1998. Maycock qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Maycock anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C2 provides representative, non-limiting examples of where Maycock discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Maycock does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Maycock alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Maycock with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### 3. U.S. Patent No. 7,403,486 ("Flask")

Flask was filed on November 1, 2004, and issued on July 22, 2008. Flask qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Flask anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C3 provides representative, non-limiting examples of where Flask discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Flask does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Flask alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Flask with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

### 4. U.S. Patent No. 5,874,992 ("Caporizzo")

Caporizzo was filed on August 16, 1996, and issued on February 23, 1999. Caporizzo qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Caporizzo anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C4 provides representative, non-limiting examples of where Caporizzo discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Caporizzo does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Caporizzo alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Caporizzo with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State

of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**5. U.S. Patent No. 8,582,694 ("Velazquez")**

Velazquez was filed on April 24, 2012, issued on November 12, 2013, and claims priority to applications filed on October 20, 2010, June 16, 2010, and April 20, 2008. Velazquez qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(e). Velazquez anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C5 provides representative, non-limiting examples of where Velazquez discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Velazquez does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Velazquez alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Velazquez with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**6. U.S. Patent 7,788,684 ("Petrovic")**

Petrovic issued on August 31, 2010. Petrovic qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Petrovic anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C6 provides representative, non-limiting examples of where Petrovic discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Petrovic does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Petrovic alone and/or in view

of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Petrovic with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**7. Broadcom Full Band Capture Chip System**

Broadcom's BCM3128 and BCM3124 full band capture cable chips were announced, publicly known and used, and available for sale on or before June 13, 2011, specifically in set-top boxes (STBs) and gateways with DOCSIS 3.0, and/or the BCM3128/3128 chips were specifically disclosed as being used in in systems with DOCSIS 3.0. This Full Band Capture Chip System qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(b). Additionally, Broadcom's BCM4528 full band capture satellite chip was announced, publicly known, and used, and available for sale on or before September 6, 2011. The Full Band Capture Chip System anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C7 provides representative, non-limiting examples of where the Full Band Capture Chip System discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that the Full Band Capture Chip System does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of the Full Band Capture Chip System alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify the Full Band Capture Chip System with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**8. U.S. Patent No. 8,126,044 ("Cavanagh")**

Cavanagh was filed on October 25, 2006, and issued on February 28, 2012. Cavanagh qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(e). Cavanagh anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C8 provides representative, non-limiting examples of where Cavanagh discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Cavanagh does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Cavanagh alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Cavanagh with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**9. International Telecommunications Union ("ITU")**

ITU refers to at least the following documents from the International Telecommunications Union:

- ITU Handbook on Spectrum Monitoring (2011)
- ITU Handbook on Satellite Communications (3d ed. 2002)
- Rec. ITU-R BO.1294 (1997)
- Rec. ITU-R BO.1516 (2001)
- Rec. ITU-R S.1878 (2010)

These documents were publicly available prior to 2012. ITU qualifies as prior art to the '008 patent under at least 35 U.S.C. § 102(a) and/or (b). ITU anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of

the '008 patent. The claim chart attached as Exhibit C9 provides representative, non-limiting examples of where ITU discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that ITU does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of ITU alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify ITU with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**10. Digital Video Broadband ("DVB")**

DVB refers to at least the following documents related to Digital Video Broadband from the European Telecommunications Standards Institute:

- ETSI EN 301 790 V1.5.1 (Digital Video Broadcasting (DVB); Interaction channel for satellite distribution systems) (May 2009);
- ETSI EN 302 307 V1.2.1 (Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications) (April 2009);
- ETSI ER 101 790 V1.4.1 (Digital Video Broadcasting (DVB); Interaction channel for Satellite Distribution Systems; Guidelines for the use of EN 301 790) (July 2009);
- ETSI TR 102 376 V1.1.1 (Digital Video Broadcasting (DVB) User guidelines for the second generation system for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2)) (February 2005);
- ETSI TR 101 290 V1.2.1 (Digital Video Broadcasting (DVB); Measurement guidelines for DVB systems) (May 2001);
- Digital Satellite Equipment Control (DiSEqC) Specifications (1998), including, *e.g.*, Bus Functional Specification (February 1998); and
- Morello et al., *DVB-S2: The Second Generation Standard for Satellite Broad-band Services* (IEEE January 2006).

These documents were publicly available prior to 2011. DVB qualifies as prior art to the '008 patent under at least 35 U.S.C. § 102(a) and/or (b). DVB anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C10 provides representative, non-limiting examples of where DVB discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that DVB does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of DVB alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify DVB with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**11. U.S. Patent No. 9,686,594 ("Gomez")**

Gomez was filed on March 30, 2012, and issued on June 20, 2017. Gomez qualifies as prior art to the '008 patent under at least 35 U.S.C. § 102(e) Gomez anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C11 provides representative, non-limiting examples of where Gomez discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Gomez does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Gomez alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Gomez with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or

in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**12. U.S. Patent No. 8,948,316 ("Currivan")**

Currivan was filed on March 23, 2012, issued on February 3, 2014, and claims priority to a Provisional Application No. 61/467,659 filed on March 25, 2011. Currivan qualifies as prior art to the '008 patent under at least 35 U.S.C. § 102(e). Currivan anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C12 provides representative, non-limiting examples of where Cavanagh discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Currivan does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Currivan alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Currivan with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**13. U.S. Patent No. 8,175,191 ("Tang")**

Tang was filed on February 20, 2008, and issued on May 8, 2012. Tang qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(e). Tang anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C13 provides representative, non-limiting examples of where Tang discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Tang does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Tang alone

and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Tang with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

**14. U.S. Patent No. 8,649,421 ("Renken")**

Renken was filed on February 17, 2012, issued on February 11, 2014, and claims priority to a provisional application filed on February 18, 2011. Renken qualifies as prior art to the '008 patent under at least 35 U.S.C. §§ 102(a) and 102(e). Renken anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) all Asserted Claims of the '008 patent. The claim chart attached as Exhibit C14 provides representative, non-limiting examples of where Renken discloses, either expressly or inherently, each element, thereby anticipating those claims. To the extent Plaintiff asserts that Renken does not anticipate any Asserted Claim, such Asserted Claim would be obvious in view of Renken alone and/or in view of the knowledge of one of ordinary skill in the art, and it would have been obvious to combine or modify Renken with concepts from other prior art, including any of the other primary references or the references identified in Appendix C or Section VI (State of the Art and Obviousness), and/or in view of the knowledge of one of ordinary skill in the art, including as explained herein, to achieve the claimed inventions.

## VI. STATE OF THE ART AND OBVIOUSNESS

The primary references identified above, as further described in the Exhibits, each discloses, either expressly or inherently, every element of the Asserted Claims of the identified Asserted Patent, thereby anticipating those claims. Additionally, each of the primary references alone (including in combination with the knowledge of a person of ordinary skill in the art) renders

obvious such Asserted Claims. To the extent Plaintiff contends that any primary reference does not anticipate or render obvious the Asserted Claims as set forth above, it would have been obvious to combine or modify the primary references with concepts from other prior art, as explained throughout these Invalidity Contentions. In particular, for each limitation of the Asserted Claims that Plaintiff contends is not met by a particular primary reference, Defendants contend that the limitation (and claim as a whole) is obvious based on a combination of that particular primary reference with (1) any other primary reference disclosing that limitation, (2) any reference identified in Appendices A–C as disclosing that limitation, (3) any statements made in the intrinsic record of such Asserted Patent, and/or (4) the knowledge of one of ordinary skill in the art (as explained in additional detail below).

Defendants do not yet have the benefit of Plaintiff's positions regarding the prior art, including what element(s), if any, Plaintiff contends are not disclosed by each prior art reference, whether Plaintiff contends that a reference is not in fact prior art, and whether Plaintiff contends that a person of ordinary skill in the art would not be motivated to combine specific references. Defendants reserve the right to supplement these obviousness positions (including identifying additional prior art combinations and the associated reasons to combine) in view of such positions and/or as discovery in the case, including expert discovery, progresses.

The information discussed in the prior art raised in these Invalidity Contentions (including all referenced listed in the P.R. 3-3(a) – Identification of Prior Art) forms part of the background knowledge of a person of ordinary skill in the art at the time each of the Asserted Patents was filed and would have been used in determining whether and how to combine references to achieve the

claimed invention(s), as discussed herein.[10] Indeed, the existence, nature, and content of each prior art reference, including the prior art references cited here, provide further evidence regarding the knowledge of a person of ordinary skill in the art at the relevant time. Defendants expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in these Invalidity Contentions, including to demonstrate that a particular claim element was known at the time of the Asserted Patents to a person of ordinary skill in the art, to show that the differences between a claimed invention and a prior art reference would have been obvious to a person of ordinary skill in the art, and to establish that a person of ordinary skill in the art would have been motivated to combine teachings of one or more references to achieve a claimed invention.

## A. General Motivations for Making Combinations of Prior Art

Defendants believe that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts; there was a reason to make each combination, each combination of art would have produced no unexpected results, and each combination at most would simply represent a known alternative to one of ordinary skill in the art. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 414–18 (2007) (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test instead espousing an "expansive and flexible" approach). Indeed, the Supreme Court held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like a pieces of a puzzle." *Id.* at 420–21.

[10] *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that "the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious").

Nevertheless, in keeping with the Local Patent Rules, in addition to the information contained elsewhere in these contentions, Defendants identify additional motivations and reasons to combine the cited art. A person of ordinary skill in the art would have been motivated to combine the primary and additional prior art references as set forth above and in Appendices A–C. Multiple teachings, suggestions, and/or reasons to modify any of the references and/or to combine any two or more of the references come from many sources, including the prior art (specific and as a whole), common knowledge, common sense, predictability, expectations, industry trends, design incentives or need, market demand or pressure, market forces, obvious to try, the nature of the problem faced, and/or knowledge possessed by one of ordinary skill in the art..[11] In addition, the patentee admits in the intrinsic record, including the specification and prosecution history of the Asserted Patents, that many of the claimed features were conventional and known in the art.

In general, a claimed invention is unpatentable if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a); *Graham v. John Deere Co.*, 383 U.S. 1, 13–14 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: "(1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." *Miles Labs., Inc. v. Shandon, Inc.*, 997 F.2d 870, 877 (Fed. Cir. 1993).

*KSR International Co. v. Teleflex Inc., et al.*, 550 U.S. 398 (2007) ("*KSR*"), reaffirmed *Graham*, holding that a claimed invention can be obvious even if there is no teaching, suggestion,

[11] Defendants reserve the right to present qualified expert testimony on any or all of these items.

or motivation for combining the prior art to produce that invention. In determining whether a claim is obvious, "[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id.* at 418. In determining whether a claim is obvious, "a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* When prior art elements are combined according to known methods to yield predictable results, the claimed invention is obvious. *Id.* at 417. In addition, "[o]ne of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims." *Id.* at 419–20. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 420.

Any suggested obviousness combinations set forth herein are in the alternative to Defendants' anticipation contentions and are not to be construed to suggest that any reference included in any combination is not anticipatory in its own right or is not the basis for a single-reference obviousness defense. In particular, Defendants are currently unaware of the extent, if any, to which Plaintiff will contend that certain limitations of the Asserted Claims are not disclosed in the art identified by Defendants as anticipatory. To the extent that an issue arises with respect to any such claim limitation, Defendants reserve the right to identify other references and combinations, which may make obvious the allegedly missing limitation in the disclosed system or method.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362–64 (Fed. Cir. 2001).

In view of the Supreme Court's *KSR* decision, the PTO issued, and updated, a set of Examination Guidelines. *See* Examination Guidelines for Determining Obviousness Under 35 U.S.C. § 103 in view of the Supreme Court Decision in *KSR International Co. v. Teleflex, Inc.*, 72 Fed. Reg. 57526 (October 10, 2007); Examination Guidelines Update: Development in the Obviousness Inquiry After *KSR v. Teleflex*, 75 Fed. Reg. 53643-60 (September 2010); *see also* MPEP § 2141 (https://www.uspto.gov/web/offices/pac/mpep/s2141.html) (accessed July 6, 2022). These Guidelines summarized the *KSR* decision and subsequent case law, as well as identified various rationales for finding a claim obvious, including those based on other precedents. Those rationales include:

(1) Combining prior art elements according to known methods to yield predictable results;

(2) Simple substitution of one known element for another to obtain predictable results;

(3) Use of known technique to improve similar devices (methods, or products) in the same way;

(4) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(5) "Obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(6) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; and

(7) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

Defendants contend that one or more of these rationales apply in considering the obviousness of the Asserted Claims of the Asserted Patents.

To the extent that prior art identified by Defendants as anticipatory are found not to anticipate the Asserted Claims: (1) the prior art establishes that the claimed subject matter was obvious to a person of ordinary skill in the art at the time of the alleged invention; (2) the claims are nevertheless unpatentable because the Asserted Claims contain nothing that goes beyond "ordinary innovation"; (3) no Asserted Claim goes beyond combining known elements to achieve predictable results (particularly in the predictable art(s) of the Asserted Patent) or does more than choose between clear alternatives known to those of skill in the art; and/or (4) the prior art renders the Asserted Claims obvious either alone or in combination with each other or one or more of the other references identified in these Invalidity Contentions.

Motivation to make the proposed combinations of prior art references and knowledge of one skilled in the art generally exists within the references themselves as well as within the knowledge of one skilled in the art in the relevant time frame. Below are exemplary specific motivations to combine references.

For example, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. Indeed, because each of these references are generally in the same field (*e.g.*, cable and/or satellite delivery systems) and/or are directed to solving the same alleged problems, including as set forth in the aforementioned claim charts, a person of ordinary skill in the art would be motivated to look for solutions in other references in that field or that solve the same alleged problems.

Relatedly, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known

techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry, and the desire to improve features and performance, would motivate the addition of features to systems as they become available, become smaller, become less expensive, become more commonly used, provide better performance, reduce costs, or predictably achieve other clearly desirable results.

Many of these prior art references cite to, rely upon, incorporate, or are described as an inherent part of one another, including as set forth in the aforementioned claim charts. To the extent such protocols or standards are not already considered inherent to or part of such references, a person of ordinary skill in the art would be motivated to combine their teachings to achieve predictable results.

Certain of the aforementioned prior art references have the same prior art author(s). A person of ordinary skill in the art would be motivated to combine the work of the same prior art author. Similarly, certain of the prior art references involved the same firms or entities in their development, such as Hughes Network Systems or Hughes Electronics Company.

As shown in the attached Exhibits, each of the references identified comes from the same field. The problems sought to be solved by the identified references and systems were the same ones that had already been solved in the prior art. Indeed, the Asserted Claims recite one of a fine number of known, available alternatives to solve these known problems. The Asserted Claims simply combine previously known methods in a way that was explicitly and implicitly taught and suggested in the prior art. Implementing the teachings of the references identified herein would achieve improved performance.

The Asserted Claims are further obvious in view of the admitted prior art in the specification and file histories of the Asserted Patents. That is, the Asserted Patents themselves admit that certain features and claim elements were known in the prior art before the effective date of the Asserted Patents. Defendants reserve the right to rely on any admissions in the Asserted Patents as part of any obviousness combination, as part of the motivation to combine, and also to explain the state of the art at the time of the Asserted Patents.

## B. Specific Motivations for Making Combinations of Prior Art

As explained above, Defendants contend that a person of ordinary skill in the art would have been motivated to combine any of the primary references in these Invalidity Contentions with (1) any other primary reference, (2) any reference disclosed in Appendices A–C as disclosing a limitation missing in a primary reference, (3) any statements made in the intrinsic record of the Asserted Patents, and/or (4) the knowledge of one of ordinary skill in the art. By way of example only, Defendants provide the following exemplary combinations and some of the reasons a person of ordinary skill in the art would be motivated to combine references.

### 1. '576 Patent

#### a. Combinations Based on Ardemagni

To the extent Ardemagni does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Ardemagni with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| Basawapatna | • Ardemagni and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | • The combination of Ardemagni and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| U.S. Patent No. 6,970,717 ("Behrens") | • Ardemagni and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Ardemagni and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Ardemagni and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Ardemagni and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| International Published Patent Application No. WO 00/004704 ("Ellis") | • Ardemagni and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Ardemagni and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • Ardemagni and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Ardemagni and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Ardemagni and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Ardemagni and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | • The combination of Ardemagni and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Ardemagni and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Ardemagni and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Petruzzelli would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Ardemagni and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Ardemagni and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Ardemagni and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Ardemagni and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | boxes with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| U.S. Patent No. 6,430,742 ("Chanteau") | • Ardemagni and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| U.S. Patent No. 3,051,938 ("Levy") | • Ardemagni and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Levy would have been the application of known techniques (*e.g.*, converting digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | signals to analog signals) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,359,447 ("Sage") | • Ardemagni and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Ardemagni and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,376,387 ("Eck") | • Ardemagni and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| U.S. Patent No. 5,724,091 ("Freeman") | • Ardemagni and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Japanese Published Unexamined Patent Application JP 2001/128138 ("Ishizaki") | • Ardemagni and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ishizaki would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Japanese Published Unexamined Patent Application JP 2002/135745 ("Ogami") | • Ardemagni and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**b. Combinations Based on Basawapatna**

To the extent Basawapatna does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Basawapatna with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| Ardemagni | • Basawapatna and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Behrens | • Basawapatna and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Basawapatna's system for distributing television and telecommunication services.<br><br>• Combining Basawapatna and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Basawapatna and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | • The combination of Basawapatna and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Basawapatna and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Basawapatna and Davis '730 relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Basawapatna and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Basawapatna and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | • The combination of Basawapatna and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • Basawapatna and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Basawapatna and James relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Basawapatna and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | cable) to known products/systems to yield predictable results. |
| Lovinggood | • Basawapatna and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Basawapatna and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Mutzig would have been the application of known techniques (*e.g.*, simultaneous |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Basawapatna and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Basawapatna and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| Williams '419 | • Basawapatna and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Basawapatna and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Basawapatna and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Basawapatna and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Basawapatna and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | • The combination of Basawapatna and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Basawapatna and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Basawapatna and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Basawapatna and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | respect to the frequency conversion table with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Basawapatna and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Basawapatna and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Basawapatna's system for distributing the broadband signal to a plurality of user devices. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | • Combining Basawapatna and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Basawapatna and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Basawapatna's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Basawapatna and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Basawapatna and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Basawapatna and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Basawapatna's system for distributing the broadband signal to a plurality of user devices. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Basawapatna |
|---|---|
| | • Combining Basawapatna and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### c. Combinations Based on Carnero

To the extent Carnero does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Carnero with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| Ardemagni | • Carnero and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Carnero and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Carnero relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Processing selected transponder signals in the digital domain and converting the selected signal back to analog prior to combining would have been obvious in view of Carnero and Behrens and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Carnero and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Behrens's digital processing of RF signals with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Carnero and Behrens would have been the application of known techniques to similar products/systems. |
| Chanteau | • Chanteau and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building). |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | • Combining the disclosures of Carnero and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Carnero and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Carnero and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Davis '055 and Carnero and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's digital processing of received transponder signals with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Carnero and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Carnero and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Carnero and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | • Combining Carnero and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Carnero and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Gregoire and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Combining Gregoire and Carnero would have been the application of known techniques to similar products/systems. |
| Inose | • Carnero and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Carnero and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and James would have yielded predictable and desirable results of receiving, selecting, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Carnero and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Carnero and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Lovinggood and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | Carnero and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Converting the selected signal back to analog prior to combining would have been obvious in view of Carnero and Lovinggood and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Lovinggood and Carnero would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Lovinggood's digital processing of received transponder signals with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Carnero would have been the application of known techniques to similar products/systems. |
| Mutzig | • Carnero and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to simultaneous reception of multiple TV channels retransmitted by satellites with Carnero's system for |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Mutzig would have been the application of known techniques (e.g., simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Oishi and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Carnero and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Carnero and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Carnero and Oishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Carnero and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Carnero and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Pugel '200 and Carnero and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Carnero would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Pugel '200's digital processing of received transponder signals with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Carnero would have been the application of known techniques to similar products/systems. |
| Williams '419 | • Carnero and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Carnero and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**d. Combinations Based on Davis '055**

To the extent Davis '055 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated

to combine Davis '055 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Ardemagni | • Davis '055 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis and Ardemagni with respect to distributing television and telecommunication services with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Davis '055 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Davis '055 relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Converting the selected signal to analog prior to combining would have been obvious in view of Davis '055 and Behrens and would have yielded predictable and desirable results of ensuring compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Davis '055 and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Davis '055 and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Carnero and Davis '055 and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's digital processing of received transponder signals to |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems. |
| Chanteau | • Chanteau and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building).<br><br>• Combining the disclosures of Davis '055 and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Davis '055 and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Davis '055 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• Davis '730 and Davis '055 share a common inventor and original assignee. |
| Ellis | • Ellis and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Davis '055 and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Davis '055 and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Davis '055's LAN-based satellite antenna/satellite multiswitch to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Davis '055 and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Gregoire and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Davis '055 and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Gregoire would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | • Additionally, a POSITA would have been motivated to combine Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's digital processing of received transponder signals with Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Gregoire would have been the application of known techniques to similar products/systems.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '055 was originally assigned to Hughes. |
| Inose | • Davis '055 and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Davis '055 and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | • The combination of Davis '055 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results.<br><br>• James and Davis '055 are currently assigned to a common assignee. |
| Kang | • Davis '055 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to its system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable system with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Lovinggood | • Davis '055 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to its digital processing of received transponder signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Davis '055 and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Mutzig would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Davis '055 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Oishi | • Oishi and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Davis '055 and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | • Combining the disclosures of Davis '055 and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Davis '055's LAN-based satellite antenna/satellite multiswitch to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Davis '055 and Oishi would have been the application of known techniques to similar products/systems. |
| Pugel '200 | • Davis '055 and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Davis '055 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Williams '419 would have been the application of known techniques (*e.g.*, to distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Williams '873 | • Davis '055 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Williams '873 would have been the application of known techniques (*e.g.*, to distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '055 share a common original assignee. |

**e. Combinations Based on Davis '730**

To the extent Davis '730 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated

to combine Davis '730 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Ardemagni | • Davis '730 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Davis '730 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Behrens | • Davis '730 and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Davis '730 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Davis '055 | • Davis '730 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Davis '730 and Davis '055 share a common inventor and original assignee. |
| Ellis | • Davis '730 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Ellis would have been the application of known techniques (*e.g.*, interactive television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Davis '730 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '730 was originally assigned to Hughes. |
| Inose | • Davis '730 and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | respect to distributing digital broadband signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Davis '730 and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results.<br><br>• James and Davis '730 are currently assigned to a common assignee. |
| Kang | • Davis '730 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Davis '730 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Davis '730 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Davis '730 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Davis '730 and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Davis '730 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '730 share a common original assignee. |
| Williams '873 | • Davis '730 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '730 share a common original assignee. |
| Gurantz | • Davis '730 and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Davis '730 and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Davis '730 and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Davis '730 and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Davis '730 and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Davis '730 and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Sage would have been the application of known techniques (*e.g.*, combining digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | signals) to known products/systems to yield predictable results. |
| Oishi | • Davis '730 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Davis '730 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Davis '730 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Davis '730 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Davis '730 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Davis '730's system for distributing multiple satellite signals over a single cable line.<br><br>• Combining Davis '730 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### f. Combinations Based on Gregoire

To the extent Gregoire does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Gregoire with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Ardemagni | • Gregoire and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | services with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Gregoire and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Basawapatna would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Gregoire relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Processing selected transponder signals in the digital domain and converting the selected signal back to analog prior to combining would have been obvious in view of Gregoire and Behrens and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Gregoire and Behrens would have been a logical extension of the existing and described signal processing techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • Additionally, a POSITA would have been motivated to combine Behrens's digital processing of RF signals with Gregoire's system for distribution of direct-to-home wireless services (such as satellite television) to more efficiently provide those services to a plurality of users requesting various transponder signals.<br><br>• Combining Gregoire and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Gregoire and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Chanteau | • Chanteau and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building).<br><br>• Combining the disclosures of Gregoire and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Gregoire and Chanteau would have been the application of known techniques to similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Davis '055 | • Gregoire and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Davis '055 and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Gregoire would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's digital processing of received transponder signals with Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Gregoire would have been the application of known techniques to similar products/systems.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '055 was originally assigned to Hughes. |
| Davis '730 | • Gregoire and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '730 was originally assigned to Hughes. |
| Ellis | • Ellis and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Gregoire and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Gregoire and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Gregoire's system for distribution of direct-to-home wireless services to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Gregoire and Ellis would have been the application of known techniques to similar products/systems. |
| Inose | • Gregoire and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Gregoire and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Gregoire and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Kang would have yielded predictable and desirable results of receiving, selecting, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Gregoire and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Lovinggood and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Converting the selected signal back to analog prior to combining would have been obvious in view of Gregoire and Lovinggood and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Lovinggood and Gregoire would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Lovinggood's digital processing of received transponder signals with Gregoire's system for distribution of direct-to-home wireless services, including selecting and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Carnero would have been the application of known techniques to similar products/systems. |
| Mutzig | • Gregoire and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Mutzig would have been the application of known techniques (*e.g.*, the simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Gregoire and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Oishi | • Oishi and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Gregoire and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Gregoire and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Gregoire's system for distribution of direct-to-home wireless services to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Gregoire and Oishi would have been the application of known techniques to similar products/systems. |
| Pugel '200 | • Gregoire and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Pugel '200 and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Gregoire would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Pugel '200's digital processing of received transponder signals with Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Gregoire would have been the application of known techniques to similar products/systems. |
| Williams '419 | • Gregoire and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '419 was originally assigned to Hughes. |
| Williams '873 | • Gregoire and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '873 was originally assigned to Hughes. |

**g. Combinations Based on Inose**

To the extent Inose does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Inose with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| Ardemagni | • Inose and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | respect to distributing television and telecommunication services with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Inose and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Inose and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Behrens would have been the application of known techniques (*e.g.*, digital processing of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | RF signals) to known products/systems to yield predictable results. |
| Carnero | • Inose and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Inose and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | network) to known products/systems to yield predictable results. |
| Davis '730 | • Inose and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Inose and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| Gregoire | • Inose and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| James | • Inose and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | cable) to known products/systems to yield predictable results. |
| Kang | • Inose and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Inose and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Inose and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Inose and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| Pugel '200 | • Inose and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Inose and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Inose and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Inose and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Inose and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | • The combination of Inose and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Inose and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Inose and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Inose and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Inose and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Inose's system for distributing digital broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | • Combining Inose and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Inose and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Inose and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Inose and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Inose and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Inose and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Inose and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Inose |
|---|---|
| | • The combination of Inose and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Inose's system for distributing digital broadband signals.<br><br>• Combining Inose and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**h. Combinations Based on James**

To the extent James does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine James with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| Ardemagni | • James and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable. |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | • Combining James and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • James and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • James and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Behrens would have been the application of known techniques (*e.g.*, digital processing of |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | RF signals) to known products/systems to yield predictable results. |
| Carnero | • James and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • James and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable. |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | • Combining James and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• James and Davis '055 are currently assigned to a common assignee. |
| Davis '730 | • James and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• James and Davis '730 are currently assigned to a common assignee. |
| Ellis | • James and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • James and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • James and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Inose would have yielded predictable and desirable results of receiving, selecting, |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| Kang | • James and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • James and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Lovinggood would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • James and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • James and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Petruzzelli would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • James and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • James and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Williams '419 would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• James and Williams '419 are currently assigned to a common assignee. |
| Williams '873 | • James and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• James and Williams '873 are currently assigned to a common assignee. |
| Gurantz | • James and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • James and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • James and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | • The combination of James and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • James and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of James and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • James and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with James's system for |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • James and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • James and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Freeman would have been the application of known techniques (*e.g.*, transmitting and |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • James and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • James and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of James and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with James's system for receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable.<br><br>• Combining James and Ogami would have been the application of known techniques (*e.g.*, distributing a signal |

| Reference to Combine | Exemplary Motivation(s) to Combine with James |
|---|---|
| | received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### i. Combinations Based on Kang

To the extent Kang does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Kang with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Ardemagni | • Kang and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Kang and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Kang and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Kang and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Kang and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Kang and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Kang and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Kang and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • Kang and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Kang and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | • The combination of Kang and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Lovinggood | • Kang and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Kang and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Kang and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Pugel '200 | • Kang and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Kang and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Williams '873 | • Kang and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Kang and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Chanteau | • Kang and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Kang and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Sage | • Kang and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Kang and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to frequency-shifting the signals to a vacant frequency band with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Oishi would have been the application of known techniques (*e.g.*, frequency-shifting the signals to a vacant frequency band) to known products/systems to yield predictable results. |
| Eck | • Kang and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Kang and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Kang and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Kang and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable.<br><br>• Combining Kang and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### j. Combinations Based on Lovinggood

To the extent Lovinggood does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Lovinggood with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| Ardemagni | • Lovinggood and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Lovinggood and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Lovinggood's system for digital processing of received transponder signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | • Combining Lovinggood and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Converting the selected signal to analog prior to combining would have been obvious in view of Lovinggood and Behrens and would have yielded predictable and desirable results of ensuring compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Lovinggood and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Lovinggood and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Carnero and Lovinggood and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Lovinggood and Carnero would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | Lovinggood's digital processing of received transponder signals to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Carnero would have been the application of known techniques to similar products/systems. |
| Chanteau | • Chanteau and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Combining the disclosures of Lovinggood and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Lovinggood and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Lovinggood and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Lovinggood and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | • The combination of Lovinggood and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Combining the disclosures of Lovinggood and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Combining Lovinggood and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Gregoire and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Lovinggood and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Lovinggood and Gregoire would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Gregoire's system for distribution of direct-to-home |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Lovinggood's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Carnero would have been the application of known techniques to similar products/systems. |
| Inose | • Lovinggood and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals with James's system for receiving broadband signals) to known products/systems to yield predictable results. |
| James | • Lovinggood and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Lovinggood and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Lovinggood and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | • Combining the disclosures of Lovinggood and Mutzig would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Lovinggood's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Mutzig would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Lovinggood and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Lovinggood and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Oishi | • Oishi and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Combining the disclosures of Lovinggood and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Combining Lovinggood and Oishi would have been the application of known techniques to similar products/systems. |
| Williams '419 | • Lovinggood and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Lovinggood and Williams '873 relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Lovinggood |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Lovinggood and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Lovinggood's system for digital processing of received transponder signals.<br><br>• Combining Lovinggood and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**k. Combinations Based on Mutzig**

To the extent Mutzig does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Mutzig with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| Ardemagni | • Mutzig and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | • Combining Mutzig and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Mutzig and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Mutzig relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Processing selected transponder signals in the digital domain and converting the selected signal back to analog prior to combining would have been obvious in view of Mutzig and Behrens and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Mutzig and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Behrens's digital processing of RF signals with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently provide those channels to a plurality of users requesting various transponder signals.<br><br>• Combining Mutzig and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Mutzig and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Chanteau | • Chanteau and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building).<br><br>• Combining the disclosures of Mutzig and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Mutzig and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Mutzig and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Davis '055 and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Davis '055 and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, including wireless communication between IRDs and an ODU.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's digital processing of received transponder signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Davis '055 and Mutzig would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Mutzig and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | cable line with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Mutzig and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Mutzig and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Mutzig and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Gregoire and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Gregoire and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | including wireless communication between IRDs and an ODU.<br><br>• Combining Gregoire and Mutzig would have been the application of known techniques to similar products/systems. |
| Inose | • Mutzig and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Mutzig and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | distribution cable) to known products/systems to yield predictable results. |
| Kang | • Mutzig and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Mutzig and Lovinggood relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Lovinggood and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Converting the selected signal back to analog prior to combining would have been obvious in view of Mutzig and Lovinggood and would have yielded predictable and desirable results of realizing resource-efficient digital processing while ensuring the signal would be compatible |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining the disclosures of Lovinggood and Mutzig would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Lovinggood's digital processing of received transponder signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Lovinggood and Mutzig would have been the application of known techniques to similar products/systems. |
| Oishi | • Oishi and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Mutzig and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Mutzig and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Mutzig and Oishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Mutzig and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Mutzig and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Digitizing the plurality of satellite broadband signals in the ODU prior to selecting and extracting selected transponder signals would have been obvious in view of Pugel '200 and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Mutzig would have been a logical extension of the existing and described signal processing techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | • Additionally, a POSITA would have been motivated to combine Pugel '200's digital processing of received transponder signals with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Mutzig would have been the application of known techniques to similar products/systems. |
| Williams '419 | • Mutzig and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Mutzig and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | receiver units with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

### l. Combinations Based on Petruzzelli

To the extent Petruzzelli does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Petruzzelli with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| Ardemagni | • Petruzzelli and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Petruzzelli and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | • The combination of Petruzzelli and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Petruzzelli and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Petruzzelli and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Petruzzelli and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Petruzzelli and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Davis '730 would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Petruzzelli and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Petruzzelli and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Inose | • Petruzzelli and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Petruzzelli and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and James would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Petruzzelli and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Petruzzelli and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Petruzzelli and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Pugel '200 | • Petruzzelli and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Petruzzelli and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Petruzzelli and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | • The combination of Petruzzelli and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Gurantz | • Petruzzelli and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Petruzzelli and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Petruzzelli and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Petruzzelli and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Petruzzelli and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Petruzzelli and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | • Combining Petruzzelli and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Petruzzelli and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Petruzzelli and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | • Combining Petruzzelli and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Petruzzelli and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Petruzzelli and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | channel) to known products/systems to yield predictable results. |
| Ogami | • Petruzzelli and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Petruzzelli's system for combining signals from the ODU to be transmitted by a single cable.<br><br>• Combining Petruzzelli and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**m. Combinations Based on Pugel '200**

To the extent Pugel '200 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Pugel '200 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| Ardemagni | • Pugel '200 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Pugel '200 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Behrens and Pugel '200 relate to the same and/or related field because both relate to signal processing, and specifically both disclose RF communication systems.<br><br>• Converting the selected signal to analog prior to combining would have been obvious in view of Pugel '200 and Behrens and would have yielded predictable and desirable results of ensuring compatibility with existing components in satellite television systems, such as integrated receiver decoders. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | • Combining the disclosures of Pugel '200 and Behrens would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Pugel '200 and Behrens would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Pugel '200 and Carnero and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Carnero would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Pugel '200's digital processing of received transponder signals to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Carnero would have been the application of known techniques to similar products/systems. |
| Chanteau | • Chanteau and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building). |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | • Combining the disclosures of Pugel '200 and Chanteau would have been a logical extension of the existing and described signal processing techniques.<br><br>• Combining Pugel '200 and Chanteau would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Pugel '200 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Davis '055 would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Davis '730 | • Pugel '200 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Mutzig relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Pugel '200 and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Pugel '200 and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Pugel '200's method and apparatus for simultaneously processing carrier signals (including in satellite communications systems) to more efficiently provide satellite services to facilitate user selection of and access to satellite services.<br><br>• Combining Pugel '200 and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Gregoire and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Pugel '200 and Gregoire and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | • Combining the disclosures of Pugel '200 and Gregoire would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Gregoire's system for distribution of direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Pugel '200's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Gregoire would have been the application of known techniques to similar products/systems. |
| Inose | • Pugel '200 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| James | • Pugel '200 and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results. |
| Kang | • Pugel '200 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Pugel '200 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Pugel '200 relate to the same and/or related field because both relate to distributing satellite transponder channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Selecting and extracting selected transponder signals after digitizing the plurality of satellite broadband signals in the ODU would have been obvious in view of Pugel '200 and Mutzig and would have yielded predictable and desirable results of reducing the number of components necessary to select and extract transponder signals and providing flexibility to increase or decrease the number of transponder signals provided to IRDs.<br><br>• Combining the disclosures of Pugel '200 and Mutzig would have been a logical extension of the existing and described signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal, with Pugel '200's digital processing of received transponder signals, to more efficiently provide satellite television services to a plurality of users requesting various transponder signals.<br><br>• Combining Pugel '200 and Mutzig would have been the application of known techniques to similar products/systems. |
| Oishi | • Oishi and Mutzig relate to the same and/or related field because both relate to distributing satellite transponder |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | channel signals at a customer/user premises (e.g., a home or office building).<br><br>• Maintaining a channel translation table at the ODU, the channel translation table specifying assigned frequency slots for transponder signals in the composite signal, and providing the channel translation table to IRDs would have been obvious in view of Pugel '200 and Oishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Pugel '200 and Oishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Oishi's television signal distributor and receiver apparatuses (including frequency conversion table) with Pugel '200's method and apparatus for simultaneously processing carrier signals (including in satellite communications systems) to more efficiently provide satellite services to facilitate user selection of and access to satellite services.<br><br>• Combining Pugel '200 and Oishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Pugel '200 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Pugel '200 |
|---|---|
| | from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Williams '419 | • Pugel '200 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Pugel '200 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Pugel '200 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Pugel '200's system for digital processing of received transponder signals.<br><br>• Combining Pugel '200 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

### n. Combinations Based on Williams '419

To the extent Williams '419 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Williams '419 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Ardemagni | • Williams '419 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Williams '419 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Williams '419's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • Combining Williams '419 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Williams '419 and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Williams '419 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Williams '419 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Davis '730 | • Williams '419 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Williams '419's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • Combining Williams '419 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '730 share a common original assignee. |
| Ellis | • Williams '419 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Williams '419 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | composite signal with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '419 was originally assigned to Hughes. |
| Inose | • Williams '419 and Inose relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Williams '419 and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results.<br><br>• James and Williams '419 are currently assigned to a common assignee. |
| Kang | • Williams '419 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Williams '419 and Lovinggood relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Williams '419 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Williams '419 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Williams '419 and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '873 | • Williams '419 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • The combination of Williams '419 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Williams '419's system for the same.<br><br>• Combining Williams '419 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Williams '419 share a common inventor and original assignee. |
| Gurantz | • Williams '419 and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Williams '419 and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • The combination of Williams '419 and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |
| Levy | • Williams '419 and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Williams '419 and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | combining digital signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Williams '419 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Williams '419 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Williams '419's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • Combining Williams '419 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Williams '419 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Williams '419 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | channel) to known products/systems to yield predictable results. |
| Ogami | • Williams '419 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### o. Combinations Based on Williams '873

To the extent Williams '873 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '576 patent, a person of ordinary skill in the art would have been motivated to combine Williams '873 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| Ardemagni | • Williams '873 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Basawapatna | • Williams '873 and Basawapatna relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Basawapatna would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Basawapatna with respect to distributing the broadband signal to a plurality of user devices with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Basawapatna would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Behrens | • Williams '873 and Behrens relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Behrens would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Behrens with respect to digital processing of RF signals with Williams |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Behrens would have been the application of known techniques (*e.g.*, digital processing of RF signals) to known products/systems to yield predictable results. |
| Carnero | • Williams '873 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Williams '873 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Williams |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '055 share a common original assignee. |
| Davis '730 | • Williams '873 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '730 share a common original assignee. |
| Ellis | • Williams '873 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Gregoire | • Williams '873 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '873 was originally assigned to Hughes. |
| Inose | • Williams '873 and Inose relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Inose would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Inose with respect to distributing digital broadband signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Inose would have been the application of known techniques (*e.g.*, distributing digital broadband signals) to known products/systems to yield predictable results. |
| James | • Williams '873 and James relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and James would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of James with respect to receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and James would have been the application of known techniques (*e.g.*, receiving broadband signals at an ODU and distributing it to IRDs via a single distribution cable) to known products/systems to yield predictable results.<br><br>• James and Williams '873 are currently assigned to a common assignee. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| Kang | • Williams '873 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers through a single cable) to known products/systems to yield predictable results. |
| Lovinggood | • Williams '873 and Lovinggood relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Lovinggood would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Lovinggood with respect to digital processing of received transponder signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Lovinggood would have been the application of known techniques (*e.g.*, digital processing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | of received transponder signals) to known products/systems to yield predictable results. |
| Mutzig | • Williams '873 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Williams '873 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU to be transmitted by a single cable with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | from the ODU to be transmitted by a single cable) to known products/systems to yield predictable results. |
| Pugel '200 | • Williams '873 and Pugel '200 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Pugel '200 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Pugel '200 with respect to digital processing of received transponder signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Pugel '200 would have been the application of known techniques (*e.g.*, digital processing of received transponder signals) to known products/systems to yield predictable results. |
| Williams '419 | • Williams '873 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Williams '873's system for the same.<br><br>• Combining Williams '873 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • Williams '873 and Williams '419 share a common inventor and original assignee. |
| Gurantz | • Williams '873 and Gurantz relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Gurantz would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Gurantz with respect to splitting the signal for delivery to multiple set-top boxes with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Gurantz would have been the application of known techniques (*e.g.*, splitting the signal for delivery to multiple set-top boxes) to known products/systems to yield predictable results. |
| Chanteau | • Williams '873 and Chanteau relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Chanteau would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Chanteau with respect to broadcasting digital data channels with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Chanteau would have been the application of known techniques (*e.g.*, broadcasting digital data channels) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| Levy | • Williams '873 and Levy relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Levy would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Levy with respect to converting digital signals to analog signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Levy would have been the application of known techniques (*e.g.*, converting digital signals to analog signals) to known products/systems to yield predictable results. |
| Sage | • Williams '873 and Sage relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Sage would have yielded predictable and desirable results of processing signals, including broadband signals communicated over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Sage with respect to combining digital signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Sage would have been the application of known techniques (*e.g.*, combining digital signals) to known products/systems to yield predictable results. |
| Oishi | • Williams '873 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Eck | • Williams '873 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Freeman | • Williams '873 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Ishizaki | • Williams '873 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Williams '873 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Williams '873's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**2. '715 Patent**

**a. Combinations Based on Ardemagni**

To the extent Ardemagni does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Ardemagni with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| Carnero | • Ardemagni and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Ardemagni and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Ardemagni and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Ardemagni and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Ardemagni's system for receiving broadband signals at an ODU and distributing it to IRDs.<br><br>• Combining Ardemagni and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Ardemagni and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Fisk would have been the application of known techniques (*e.g.*, system and method of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Ardemagni and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Ardemagni and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Ardemagni's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Ardemagni and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Ardemagni and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | reception of multiple TV channels retransmitted by satellites with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Ardemagni and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Oishi would have been the application of known techniques (*e.g.*, frequency-shifting the signals to a vacant frequency band) to known products/systems to yield predictable results. |
| Petruzzelli | • Ardemagni and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | signals from the ODU with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Ardemagni and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Ardemagni and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Freeman | • Ardemagni and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,099,951 ("Laksono '951") | • Ardemagni and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Ardemagni's system for distributing television and telecommunication services. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | • Combining Ardemagni and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,200,855 ("Laksono '855") | • Ardemagni and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| U.S. Patent No. 7,301,900 ("Laksono '900") | • Ardemagni and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Ardemagni and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| Eck | • Ardemagni and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| International Published Patent Application No. WO 01/005156 ("Eames") | • Ardemagni and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Ardemagni and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| | Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Ardemagni and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Ardemagni and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Ardemagni's system for distributing television and telecommunication services.<br><br>• Combining Ardemagni and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |
| TR 101 201 V1.1.1 (1997-10) - "Digital Video | • Ardemagni and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Ardemagni |
|---|---|
| Broadcasting (DVB); Interaction channel for Satellite Master Antenna TV (SMATV) distribution systems; Guidelines for versions based on satellite and coaxial sections ("TR 101 201 V1.1.1") | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• Ardemagni explains that its "invention relates to a system of the above mentioned kind that enables the already existing facilities designed for centralized distribution of land based television channels, also known as Master Antenna TV (MATV) to be adapted, in economically convenient and reliable way," and TR 101 201 V1.1.1 is a document describing the MATV standard for satellites. |

**b. Combinations Based on Carnero**

To the extent Carnero does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Carnero with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| Ardemagni | • Carnero and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| Davis '055 | • Carnero and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's interface device Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Carnero's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Carnero and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals ) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| Ellis | • Ellis and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Carnero and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Carnero and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Carnero and Ellis would have been the application of known techniques to similar products/systems. |
| Fisk | • Carnero and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Fisk's server with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Carnero's composite signal to a plurality of devices over a digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Fisk and Carnero would have been the application of known techniques to similar products/systems. |
| Gregoire | • Carnero and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distribution of direct-to-home wireless services with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Gregoire would have been the application of known techniques (*e.g.*, distribution of direct-to-home wireless services) to known products/systems to yield predictable results. |
| Hicks | • Carnero and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Hicks's gateway with Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | of Carnero's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Hicks and Carnero would have been the application of known techniques to similar products/systems. |
| Kang | • Carnero and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Carnero and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to simultaneous reception of multiple TV channels retransmitted by satellites with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| U.S. Patent No. 6,480,551 ("Ohishi") | • Ohishi and Carnero relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (*e.g.*, a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Carnero and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Carnero and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information table) with Carnero's system for distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Carnero and Oishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Carnero and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Carnero and Williams '419 to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Carnero and Williams '873 to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Carnero and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Carnero |
|---|---|
| | broadband signals to multiple receiver units with Carnero's system for distributing television satellite signals in a community antenna system.<br><br>• Combining Carnero and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**c. Combinations Based on Davis '055**

To the extent Davis '055 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Davis '055 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Ardemagni | • Ardemagni and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Ardemagni would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ardemagni's system for distributing television and telecommunication services from a peripheral node to user terminals, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's interface device to provide a single, aggregated signal for distribution by Davis '055's interface device.<br><br>• Combining Davis '055 and Ardemagni would have been the application of known techniques to similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Carnero | • Carnero and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Davis '055's interface device, to provide a single, aggregated signal for distribution by Davis '055's interface device.<br><br>• Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Davis '055 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals ) to known products/systems to yield predictable results.<br><br>• Davis '730 and Davis '055 share a common inventor and original assignee. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| Fisk | • Davis '055 and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to with respect to its system and method of distributing television, video and other signals with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Fisk would have been the application of known techniques (*e.g.*, distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Davis '055 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distribution of direct-to-home wireless services with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Gregoire would have been the application of known techniques (*e.g.*, respect to distribution of direct-to-home wireless services) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | • Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '055 was originally assigned to Hughes. |
| Hicks | • Davis '055 and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to its digital residential entertainment system with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Hicks would have been the application of known techniques (*e.g.*, digital residential entertainment system) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Ellis and Davis '055 and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Davis '055 and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | with Davis '055's LAN-based satellite antenna/satellite multiswitch to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Davis '055 and Ellis would have been the application of known techniques to similar products/systems. |
| Kang | • Davis '055 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to its system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | delivering the requested transponders on a composite signal, with Davis '055's interface device to provide a single, aggregated signal for distribution by Davis '055's interface device.<br><br>• Combining Davis '055 and Mutzig would have been the application of known techniques to similar products/systems. |
| Ohishi | • Ohishi and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Davis '055 and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Davis '055 and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Davis '055's LAN-based satellite antenna/satellite multiswitch to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Fisk and Ohishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Davis '055 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Davis '055 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Williams '419 would have been the application of known techniques (*e.g.*, to distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Williams '873 | • Davis '055 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '055 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '055 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Davis '055's system for connecting multiple indoor units to at least one satellite antenna via a local area network.<br><br>• Combining Davis '055 and Williams '873 would have been the application of known techniques (*e.g.*, to distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '055 share a common original assignee. |

**d. Combinations Based on Davis '730**

To the extent Davis '730 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Davis '730 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| Ardemagni | • Davis '730 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Davis '730 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Carnero would have been the application of known techniques (*e.g.*, distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals) to known products/systems to yield predictable results. |
| Davis '055 | • Davis '730 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Davis '730's system for distributing multiple satellite signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • Combining Davis '730 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Davis '730 and Davis '055 share a common inventor and original assignee. |
| Ellis | • Davis '730 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Davis '730 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Davis '730 and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | distributing television, video and other signals with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Davis '730 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '730 was originally assigned to Hughes. |
| Hicks | • Davis '730 and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Davis '730 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Davis '730 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Davis '730 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Petruzzelli | • Davis '730 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Davis '730 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '730 share a common original assignee. |
| Williams '873 | • Davis '730 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Davis '730's system for distributing the broadband signal to a plurality of user devices.<br><br>• Combining Davis '730 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '730 share a common original assignee. |
| Freeman | • Davis '730 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Davis '730 and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | • The combination of Davis '730 and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Davis '730 and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Davis '730 and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Davis '730 and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Davis '730 and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Davis '730 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Davis '730 and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | signals to a gateway device with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Davis '730 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Davis '730 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Davis '730 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable |

| Reference to Combine | Exemplary Motivation(s) to Combine with Davis '730 |
|---|---|
| | with Davis '730's system for distributing multiple satellite signals.<br><br>• Combining Davis '730 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**e. Combinations Based on Fisk**

To the extent Fisk does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Fisk with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| Ardemagni | • Ardemagni and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Ardemagni would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ardemagni's system for distributing television and telecommunication services from a peripheral node to user terminals, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Fisk's server, to provide a single, aggregated signal for distribution by Fisk's server.<br><br>• Combining Fisk and Ardemagni would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Fisk's server, to provide a single, aggregated signal for distribution by Fisk's server.<br><br>• Combining Fisk and Carnero would have been the application of known techniques to similar products/systems. |
| Davis '055 | • Fisk and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Fisk and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | • The combination of Fisk and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Ellis and Fisk and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Fisk and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Fisk's system and method of distributing television, video and other signals to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Fisk and Ellis would have been the application of known techniques to similar products/systems. |
| Hicks | • Fisk and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Hicks would have been the application of known techniques (*e.g.*, a gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Fisk and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to distributing multiple satellite signals with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Fisk's server to provide a single, aggregated signal for distribution by Fisk's server.<br><br>• Combining Fisk and Mutzig would have been the application of known techniques to similar products/systems. |
| Oishi | • Fisk and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Ohishi | • Ohishi and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Fisk and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Fisk and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Fisk's system and method of distributing television, video and other signals to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Fisk and Ohishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Fisk and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Petruzzelli would have been the application of known techniques (*e.g.*, with respect to combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Fisk and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Fisk |
|---|---|
| | • The combination of Fisk and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Fisk and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Fisk and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Fisk's system and method of distributing television, video and other signals.<br><br>• Combining Fisk and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**f. Combinations Based on Gregoire**

To the extent Gregoire does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated

to combine Gregoire with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Ardemagni | • Gregoire and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Davis '055 | • Gregoire and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's interface device with Gregoire's system for distribution of direct-to-home wireless services, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Gregoire's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • Combining Davis '055 and Carnero would have been the application of known techniques to similar products/systems.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '055 was originally assigned to Hughes. |
| Davis '730 | • Gregoire and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Davis '730 was originally assigned to Hughes. |
| Ellis | • Ellis and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Gregoire and Ellis and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • Combining the disclosures of Gregoire and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Gregoire's system for distribution of direct-to-home wireless services to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Gregoire and Ellis would have been the application of known techniques to similar products/systems. |
| Fisk | • Gregoire and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Gregoire would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Fisk's server with Gregoire's system for distribution of direct-to-home wireless services, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Gregoire's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Fisk and Gregoire would have been the application of known techniques to similar products/systems. |
| Hicks | • Gregoire and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • Combining the disclosures of Hicks and Gregoire would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Hicks's gateway with Gregoire's system for distribution of direct-to-home wireless services, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Gregoire's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Hicks and Gregoire would have been the application of known techniques to similar products/systems. |
| Kang | • Gregoire and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Gregoire and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| | • The combination of Gregoire and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Mutzig would have been the application of known techniques (*e.g.*, the simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Ohishi | • Ohishi and Gregoire relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Gregoire and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Gregoire and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Gregoire's system for distribution of direct-to-home wireless services to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Gregoire and Oishi would have been the application of known techniques to similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Petruzzelli | • Gregoire and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Gregoire and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '419 was originally assigned to Hughes. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gregoire |
|---|---|
| Williams '873 | • Gregoire and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Gregoire and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Gregoire's system for distribution of direct-to-home wireless services.<br><br>• Combining Gregoire and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '873 was originally assigned to Hughes. |
| TR 101 201 V1.1.1 (1997-10) - "Digital Video Broadcasting (DVB); Interaction channel for Satellite Master Antenna TV (SMATV) distribution systems; Guidelines for versions based on satellite and coaxial sections ("TR 101 201 V1.1.1") | • Gregoire and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• |

**g. Combinations Based on Hicks**

To the extent Hicks does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Hicks with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| Ardemagni | • Ardemagni and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Ardemagni would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ardemagni's system for distributing television and telecommunication services from a peripheral node to user terminals, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Hicks's gateway, to provide a single, aggregated signal for distribution by Hicks's gateway.<br><br>• Combining Fisk and Ardemagni would have been the application of known techniques to similar products/systems. |
| Carnero | • Carnero and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Carnero would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Carnero's system for distributing television satellite signals in a community antenna system, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, with Hicks's gateway, to provide a single, aggregated signal for distribution by Hicks's gateway.<br><br>• Combining Hicks and Carnero would have been the application of known techniques to similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| Davis '055 | • Hicks and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Hicks and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Hicks relate to the same and/or related field because both relate to distributing multimedia to and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Ellis and Hicks and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Hicks and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Hicks's digital residential entertainment system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Hicks and Ellis would have been the application of known techniques to similar products/systems. |
| Gregoire | • Hicks and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Hicks's system including a gateway to provide a single, aggregated signal for distribution. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | • Combining Hicks and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Kang | • Hicks and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Mutzig and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | delivering the requested transponders on a composite signal, with Hicks's gateway to provide a single, aggregated signal for distribution by Hicks's gateway.<br><br>• Combining Hicks and Mutzig would have been the application of known techniques to similar products/systems. |
| Oishi | • Hicks and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Ohishi | • Ohishi and Hicks relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Hicks and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Hicks and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | • Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Hicks's digital residential entertainment system to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Hicks and Ohishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Hicks and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Hicks and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Hicks's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Hicks |
|---|---|
| | system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Hicks and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Hicks and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Hicks's system including a gateway to provide a single, aggregated signal for distribution.<br><br>• Combining Hicks and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

**h. Combinations Based on Kang**

To the extent Kang does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Kang with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Ardemagni | • Kang and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Kang and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Davis '055 | • Kang and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Kang and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| Ellis | • Kang and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Kang and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Kang and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Kang and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Kang and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Kang's system |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Mutzig | • Kang and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Kang and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | table with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Petruzzelli | • Kang and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Kang and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Kang's system for receiving and distributing satellite broadcasting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Kang and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Freeman | • Kang and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Kang's system for receiving |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Kang and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Kang and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | • Combining Kang and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Kang and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Kang and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Kang and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | • Combining Kang and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Kang and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Kang's system for distributing television and telecommunication services.<br><br>• Combining Kang and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Kang and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Ishizaki would have been the application of known techniques (*e.g.*, distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Kang |
|---|---|
| | multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Kang and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Kang and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Kang's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Kang and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |
| TR 101 201 V1.1.1 | • Kang and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• Kang explains that its "[i]n general, the Satellite Master Antenna Television (hereinafter abbreviated as "SMATV") is a system that receives satellite broadcasts through a central antenna used jointly and distributes them to public service areas (e.g., apartments, hotels, hospitals, etc.)," and TR 101 201 V1.1.1 is a document describing the SMATV standard. |

### i. Combinations Based on Mutzig

To the extent Mutzig does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Mutzig with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| Ardemagni | • Mutzig and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Davis '055 | • Mutzig and Davis '055 relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Davis '055 and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Davis '055's interface device with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Mutzig's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Davis '055 and Mutzig would have been the application of known techniques to similar products/systems. |
| Davis '730 | • Mutzig and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including communicating a plurality of transponder signals over a single cable. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals over a single cable line with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals over a single cable line) to known products/systems to yield predictable results. |
| Ellis | • Ellis and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Ellis and Mutzig and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | • Combining the disclosures of Mutzig and Ellis would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ellis's interactive television program guide system with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Mutzig and Ellis would have been the application of known techniques to similar products/systems. |
| Fisk | • Mutzig and Fisk relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Combining the disclosures of Fisk and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Fisk's server with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Mutzig's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Fisk and Mutzig would have been the application of known techniques to similar products/systems. |
| Gregoire | • Mutzig and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Gregoire would have yielded predictable and desirable results of receiving, selecting, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Hicks and Mutzig relate to the same and/or related field because both relate to distributing multimedia to and throughout a customer/user premises (e.g., a home or office building), including where a plurality of customer/users are selecting, *inter alia*, a plurality of different satellite television channels.<br><br>• Combining the disclosures of Hicks and Mutzig would have been a logical extension of the existing and described satellite signal distribution and signal processing techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Hicks's gateway with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites, including selecting and translating requested transponder signals and delivering the requested transponders on a composite signal, to facilitate distribution of Mutzig's composite signal to a plurality of devices over a digital network and ensure compatibility with existing components in satellite television systems, such as integrated receiver decoders.<br><br>• Combining Hicks and Gregoire would have been the application of known techniques to similar products/systems. |
| Kang | • Mutzig and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Oishi | • Mutzig and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Ohishi | • Ohishi and Mutzig relate to the same and/or related field because both relate to distributing satellite television signals at a customer/user premises (e.g., a home or office building), |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | including where a plurality of customer/users are selecting a plurality of different channels.<br><br>• Maintaining a channel translation table, which maps original channel locations on the selector input to new channel locations on the selector output, and communicating the channel translation table to devices in the network would have been obvious in view of Mutzig and Ohishi and would have yielded predictable and desirable results of facilitating user selection of and access to satellite television channels.<br><br>• Combining the disclosures of Mutzig and Ohishi would have been a logical extension of the existing and described satellite signal distribution techniques.<br><br>• Additionally, a POSITA would have been motivated to combine Ohishi's signal processing device (including network information able) with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites to more efficiently provide satellite television services to facilitate user selection of and access to satellite television channels.<br><br>• Combining Mutzig and Ohishi would have been the application of known techniques to similar products/systems. |
| Petruzzelli | • Mutzig and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals |

| Reference to Combine | Exemplary Motivation(s) to Combine with Mutzig |
|---|---|
| | from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Mutzig and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Mutzig and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Mutzig and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Mutzig's system for simultaneous reception of multiple TV channels retransmitted by satellites.<br><br>• Combining Mutzig and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

### j. Combinations Based on Oishi

To the extent Oishi does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Oishi with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| Ardemagni | • Oishi and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Oishi and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | of users requesting various transponder signals with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Davis '055 | • Oishi and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results. |
| Davis '730 | • Oishi and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | multiple satellite signals with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Oishi and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Oishi and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Oishi's system for providing a frequency conversion table.<br><br>• Combining Petruzzelli and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Oishi and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Oishi's system for providing a frequency conversion table. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | • Combining Oishi and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Oishi and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Oishi and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | single, aggregated signal for distribution with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Oishi and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Oishi and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | with Oishi's system for receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers.<br><br>• Combining Oishi and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Petruzzelli | • Oishi and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Oishi and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | broadband signals to multiple receiver units with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Oishi and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Freeman | • Oishi and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Oishi's system for providing a frequency conversion table. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | • Combining Oishi and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Oishi and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Oishi and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Oishi and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Oishi and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| Laksono '900 | • Oishi and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Oishi and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Oishi and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Oishi and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | • The combination of Oishi and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Oishi and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Oishi and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Oishi and Ogami would have yielded predictable and desirable results of receiving, selecting, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Oishi |
|---|---|
| | combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Oishi's system for providing a frequency conversion table.<br><br>• Combining Oishi and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

**k. Combinations Based on Petruzzelli**

To the extent Petruzzelli does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Petruzzelli with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| Ardemagni | • Petruzzelli and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Ardemagni would have been the application of known techniques (*e.g.*, distributing television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Petruzzelli and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Davis '055 | • Petruzzelli and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | network) to known products/systems to yield predictable results. |
| Davis '730 | • Petruzzelli and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |
| Ellis | • Petruzzelli and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| Fisk | • Petruzzelli and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Petruzzelli and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | transponders on a composite signal) to known products/systems to yield predictable results. |
| Hicks | • Petruzzelli and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Petruzzelli and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Petruzzelli and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Petruzzelli and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Oishi would have been the application of known techniques (*e.g.*, the frequency |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | conversion table) to known products/systems to yield predictable results. |
| Williams '419 | • Petruzzelli and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |
| Williams '873 | • Petruzzelli and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| Freeman | • Petruzzelli and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Petruzzelli and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Petruzzelli and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Petruzzelli and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | • The combination of Petruzzelli and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Petruzzelli and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Petruzzelli and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Petruzzelli and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Petruzzelli and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Petruzzelli and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petruzzelli |
|---|---|
| | channel with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |
| Ogami | • Petruzzelli and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Petruzzelli and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Petruzzelli's system for combining signals from the ODU.<br><br>• Combining Petruzzelli and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |

### l. Combinations Based on Williams '419

To the extent Williams '419 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Williams '419 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Ardemagni | • Williams '419 and Ardemagni relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Williams '419 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |
| Davis '055 | • Williams '419 and Davis '055 relate to the same and/or related field because both relate to distributing broadband |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Williams '419 and Davis '055 share a common original assignee. |
| Davis '730 | • Williams '419 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Davis '730 would have been the application of known techniques (*e.g.*, distributing multiple satellite signals) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • Williams '419 and Davis '055 share a common original assignee. |
| Ellis | • Williams '419 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Williams '419 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Williams '419 and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Fisk would have been the application of known techniques (*e.g.*, system and method of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Williams '419 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '419 was originally assigned to Hughes. |
| Hicks | • Williams '419 and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Williams '419 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Williams '419 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Mutzig would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Williams '419 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Petruzzelli | • Williams '419 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '873 | • Williams '419 and Williams '873 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Williams '873 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '873 with respect to distributing broadband signals to multiple receiver units with Williams '419's system for the same.<br><br>• Combining Williams '419 and Williams '873 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Williams '419 share a common inventor and original assignee. |
| Freeman | • Williams '419 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Williams '419 and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Williams '419 and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source with Williams '419's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| | • Combining Williams '419 and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Williams '419 and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '419 and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Williams '419 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Eames | • Williams '419 and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Williams '419 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical channel) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '419 |
|---|---|
| Ogami | • Williams '419 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '419 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Williams '419's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '419 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |
| TR 101 201 V1.1.1 | • Williams '419 and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• Williams '419 recognizes the SMATV standard as a proposed system to resolve problems in the art, and TR 101 201 V1.1.1 is a document describing the SMATV standard. |

**m. Combinations Based on Williams '873**

To the extent Williams '873 does not anticipate and/or render obvious on its own any of the Asserted Claims of the '715 patent, a person of ordinary skill in the art would have been motivated to combine Williams '873 with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| Ardemagni | • Williams '873 and Ardemagni relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ardemagni would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ardemagni with respect to distributing television and telecommunication services with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ardemagni would have been the application of known techniques (*e.g.*, distributing television and telecommunication services) to known products/systems to yield predictable results. |
| Carnero | • Williams '873 and Carnero relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Carnero would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Carnero with respect to distributing television satellite signals in a community antenna system to more efficiently provide satellite television services to a plurality of users requesting various transponder signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Carnero would have been the application of known techniques (*e.g.*, distributing the broadband signal to a plurality of user devices) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| Davis '055 | • Williams '873 and Davis '055 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Davis '055 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '055 with respect to connecting multiple indoor units to at least one satellite antenna via a local area network with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Davis '055 would have been the application of known techniques (*e.g.*, connecting multiple indoor units to at least one satellite antenna via a local area network) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '055 share a common original assignee. |
| Davis '730 | • Williams '873 and Davis '730 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Davis '730 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Davis '730 with respect to distributing multiple satellite signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Davis '730 would have been the application of known techniques (*e.g.*, distributing |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | multiple satellite signals) to known products/systems to yield predictable results.<br><br>• Williams '873 and Davis '730 share a common original assignee. |
| Ellis | • Williams '873 and Ellis relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of distributing the broadband signals.<br><br>• The combination of Williams '873 and Ellis would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ellis with respect to the interactive television program guide system with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ellis would have been the application of known techniques (*e.g.*, interactive television program guide system) to known products/systems to yield predictable results. |
| Fisk | • Williams '873 and Fisk relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Fisk would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Fisk with respect to its system and method of distributing television, video and other signals with Williams '873's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • Combining Williams '873 and Fisk would have been the application of known techniques (*e.g.*, system and method of distributing television, video and other signals) to known products/systems to yield predictable results. |
| Gregoire | • Williams '873 and Gregoire relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Gregoire would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Gregoire with respect to distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Gregoire would have been the application of known techniques (*e.g.*, distributing direct-to-home wireless services, including selecting and extracting requested transponder signals and delivering the requested transponders on a composite signal) to known products/systems to yield predictable results.<br><br>• Gregoire explains that its "disclosure will focus the invention's application on the" Hughes DTV system, and Williams '873 was originally assigned to Hughes. |
| Hicks | • Williams '873 and Hicks relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Hicks would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Hicks with respect to a gateway to provide a single, aggregated signal for distribution with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Hicks would have been the application of known techniques (*e.g.*, gateway to provide a single, aggregated signal for distribution) to known products/systems to yield predictable results. |
| Kang | • Williams '873 and Kang relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Kang would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Kang with respect to receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Kang would have been the application of known techniques (*e.g.*, receiving and distributing satellite broadcasting signals through a common antenna and transmitting it to subscribers) to known products/systems to yield predictable results. |
| Mutzig | • Williams '873 and Mutzig relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Mutzig would have yielded predictable and desirable results of receiving, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Mutzig with respect to the simultaneous reception of multiple TV channels retransmitted by satellites with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Mutzig would have been the application of known techniques (*e.g.*, simultaneous reception of multiple TV channels retransmitted by satellites) to known products/systems to yield predictable results. |
| Oishi | • Williams '873 and Oishi relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Oishi would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Oishi with respect to the frequency conversion table with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Oishi would have been the application of known techniques (*e.g.*, the frequency conversion table) to known products/systems to yield predictable results. |
| Petruzzelli | • Williams '873 and Petruzzelli relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Petruzzelli would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Petruzzelli with respect to combining signals from the ODU with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Petruzzelli would have been the application of known techniques (*e.g.*, combining signals from the ODU) to known products/systems to yield predictable results. |
| Williams '419 | • Williams '873 and Williams '419 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Williams '419 would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Williams '419 with respect to distributing broadband signals to multiple receiver units with Williams '873's system for the same.<br><br>• Combining Williams '873 and Williams '419 would have been the application of known techniques (*e.g.*, distributing broadband signals to multiple receiver units) to known products/systems to yield predictable results.<br><br>• Williams '873 and Williams '419 share a common inventor and original assignee. |
| Freeman | • Williams '873 and Freeman relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Freeman would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Freeman with respect to transmitting and combining digital signals with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Freeman would have been the application of known techniques (*e.g.*, transmitting and combining digital signals) to known products/systems to yield predictable results. |
| Laksono '951 | • Williams '873 and Laksono '951 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Laksono '951 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '951 with respect to receiving a plurality of channels from a multimedia source with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Laksono '951 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '855 | • Williams '873 and Laksono '855 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Laksono '855 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '855 with respect to receiving a plurality of channels from a multimedia source |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Laksono '855 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Laksono '900 | • Williams '873 and Laksono '900 relate to the same and/or related field because both relate to processing signals. Both references discuss aspects of processing signals.<br><br>• The combination of Williams '873 and Laksono '900 would have yielded predictable and desirable results of processing signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Laksono '900 with respect to receiving a plurality of channels from a multimedia source with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Laksono '900 would have been the application of known techniques (*e.g.*, receiving a plurality of channels from a multimedia source) to known products/systems to yield predictable results. |
| Eck | • Williams '873 and Eck relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Eck would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eck with respect to storing a translation table with Williams '873's system for distributing broadband signals to multiple receiver units. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | • Combining Williams '873 and Eck would have been the application of known techniques (*e.g.*, storing a translation table) to known products/systems to yield predictable results. |
| Eames | • Williams '873 and Eames relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Eames would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Eames with respect to receiving broadcast signals to a gateway device with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Eames would have been the application of known techniques (*e.g.*, receiving broadcast signals to a gateway device) to known products/systems to yield predictable results. |
| Ishizaki | • Williams '873 and Ishizaki relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ishizaki would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ishizaki with respect to distributing multiplexed signals to subscribers on the same physical channel with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ishizaki would have been the application of known techniques (*e.g.*, distributing multiplexed signals to subscribers on the same physical |

| Reference to Combine | Exemplary Motivation(s) to Combine with Williams '873 |
|---|---|
| | channel) to known products/systems to yield predictable results. |
| Ogami | • Williams '873 and Ogami relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• The combination of Williams '873 and Ogami would have yielded predictable and desirable results of receiving, selecting, combining, and distributing the broadband signals, including a plurality of transponder signals in a composite signal through, for example, a local area network. For example, a POSITA would have been motivated to combine the disclosure of Ogami with respect to distributing a signal received by an antenna to multiple rooms via a coaxial cable with Williams '873's system for distributing broadband signals to multiple receiver units.<br><br>• Combining Williams '873 and Ogami would have been the application of known techniques (*e.g.*, distributing a signal received by an antenna to multiple rooms via a coaxial cable) to known products/systems to yield predictable results. |
| TR 101 201 V1.1.1 | • Williams '873 and TR 101 201 V1.1.1 relate to the same and/or related field because both relate to distributing broadband signals. Both references discuss aspects of receiving, selecting, combining, and distributing the broadband signals.<br><br>• Williams '873 recognizes the SMATV standard as a proposed system to resolve problems in the art, and TR 101 201 V1.1.1 is a document describing the SMATV standard. |

### 3. '008 Patent

#### a. Combinations Based on Coyne

To the extent Coyne does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated

to combine Coyne with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| Maycock | • Coyne and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Coyne and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Flask would have been the application of known techniques (*e.g.*, measuring and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Coyne and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Coyne and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Coyne and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Coyne and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Broadcom Full Band Capture Chip System would have been the application of known |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Coyne and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Coyne and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Coyne and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Coyne and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Coyne and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Coyne and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| U.S. Patent No. 8,352,995 (Filed Jan. 7, 2011, Issued Jan. 8, 2013) ("Sadja") | • Coyne and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| U.S. Patent No. 8,494,091 (Filed May 30, 2012, claiming priority to Mar. 28, 2007, Issued Jul. 23, 2013) ("Yu") | • Coyne and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Coyne and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| U.S. Patent Publication No. 2011/0176060 (Filed Mar. 2, 2010, Published July 21, 2011) ("Lee") | • Coyne and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |
| BCM4528 Chip (Available, known, and/or sold on or before Sep. 6, 2011) ("BCM4528 Announcement") | • Coyne and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Coyne |
|---|---|
| | • The combination of Coyne and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Coyne's system for receiving and analyzing signals.<br><br>• Combining Coyne and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**b. Combinations Based on Maycock**

To the extent Maycock does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Maycock with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| Petrovic | • Maycock and Petrovic relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Maycock and Petrovic relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Petrovic and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Petrovic and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | • Combining Maycock and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Maycock and Coyne relate to the same and/or related field because both relate to signal processing and analysis and specifically both disclose satellite systems. Additionally, both Maycock and Coyne relate to monitoring and analysis of received content, including satellite transmitted content. For example, it would have been obvious to combine the techniques disclosed in Coyne for satellite communications with Maycock because Maycock discloses satellite TV systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Coyne and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Coyne and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Coyne would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Maycock and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | monitoring/reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Flask would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Maycock and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Caporizzo would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Maycock and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Maycock and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Maycock to capture, channelize, analyze and report on the full spectrum of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Full Band Capture Chip System | • Maycock and the Full Band Capture Chip System relate to the same and/or related fields of processing television transmissions. Both Maycock and the Full Band Capture Chip System disclose cable TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the Full Band Capture Chip System with Maycock because Maycock also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Maycock would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Maycock. Full band capture allowed for advantages such as quicker channel switching and display, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | for example in a household watching and switching between channels on multiple displays/televisions simultaneously. |
| Cavanagh | • Cavanagh and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Maycock and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and ITU would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable result |
| DVB | • Maycock and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and DVB would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Maycock and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Gomez would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Currivan | • Maycock and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Maycock and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Maycock and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Currivan would have been the application of known techniques (e.g., analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Tang | • Maycock and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Maycock and Currivan relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and Maycock to capture, channelize, analyze and report on the full spectrum of received content |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Maycock relating to analysis/monitoring and display of received television signals. |
| BCM4528 | • Maycock and the BCM4528 chip relate to the same and/or related fields of processing television transmissions. Both Maycock and the BCM4528 chip disclose satellite TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the BCM4528 chip with Maycock because Maycock also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the BCM4528 chip and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of the BCM4528 chip and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Maycock would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the BCM4528 chip.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Maycock. Full band capture allowed for advantages such as quicker channel switching and display, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining Maycock and the BCM4528 would have been the application of known techniques (e.g., analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Sadja | • Maycock and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and channelizing with Sadja's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Maycock and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Maycock's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | • Combining Maycock and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Maycock and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Maycock's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Lee | • Maycock and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Maycock and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality and adjusting based on the analysis with Maycock's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Maycock and Lee would have been the application of known techniques (*e.g.*, monitoring and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Maycock |
|---|---|
| | reporting signal quality) to known products/systems to yield predictable results. |

**c. Combinations Based on Flask**

To the extent Flask does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Flask with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| Coyne | • Flask and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Flask and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | • The combination of Flask and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Flask and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Flask and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Flask and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Flask and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Flask and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Flask and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Flask and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Flask and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | qualities of a full spectrum band with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Flask and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Flask and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Flask's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| U.S. Patent No. 5,535,240 (Filed Oct. 29, 1993, Issued Jul. 9, 1996) ("Carney") | • Flask and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Pugel '520 | • Flask and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | • Combining Flask and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| U.S. Patent No. 6,704,372 (Filed Sept. 18, 2001, Issued Mar. 9, 2004) ("Zhang") | • Flask and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| U.S. Patent Publication No. 2009/0290602 (Published Nov. 26, 2009) ("McNeely") | • Flask and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| Lee | • Flask and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |
| Chen '760 | • Flask and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Flask and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Flask's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Flask and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Flask |
|---|---|
| BCM4528 Announcement | • Flask and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Flask and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Flask's system for receiving and analyzing signals.<br><br>• Combining Flask and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**d. Combinations Based on Caporizzo**

To the extent Caporizzo does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Caporizzo with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| Coyne | • Caporizzo and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | received spectrum with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Caporizzo and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Caporizzo and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Caporizzo and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Caporizzo and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | transmission of media content with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Caporizzo and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Caporizzo and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Caporizzo and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Caporizzo and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | qualities of a signal with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Caporizzo and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Caporizzo and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Caporizzo and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Carney | • Caporizzo and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | • Combining Caporizzo and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • Caporizzo and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Caporizzo and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Yu would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Caporizzo and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Pugel '520 | • Caporizzo and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| Zhang | • Caporizzo and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • Caporizzo and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • Caporizzo and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Caporizzo |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Caporizzo and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Caporizzo's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Caporizzo and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • Caporizzo and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Caporizzo and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Caporizzo's system for receiving and analyzing signals.<br><br>• Combining Caporizzo and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**e. Combinations Based on Velazquez**

To the extent Velazquez does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated

to combine Velazquez with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| Maycock | • Maycock and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Maycock and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would have been obvious in view of Maycock because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Maycock and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Petrovic and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Petrovic and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would have been obvious in view of Petrovic because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Petrovic and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Coyne and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum and/or satellite signals. Additionally, both Coyne and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals and disclose satellite systems. Both Coyne and Velazquez also disclose and relate to receivers for military communications.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Coyne and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Coyne's system for digitizing, channelizing, and analyzing received signals. Combining the disclosures of Velazquez and Coyne to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Coyne and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | of a signal) to known products/systems to yield predictable results. Further combining the systems and techniques from Velazquez and Coyne would have been the extension of known wideband capture techniques and would have had predictable results.<br><br>• The combination of Coyne and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed.<br><br>• Combining Coyne and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Velazquez and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Flask would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Velazquez and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Caporizzo would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Full Band Capture Chip System | • The Full Band Capture Chip System and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum and/or satellite signals. Additionally, both the Full Band Capture Chip System and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals and disclose satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Velazquez and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Velazquez to capture, channelize, analyze and report on the full spectrum of a received television spectrum would have been a logical extension of the existing and described techniques.<br><br>• Implementing television full band capture and analysis/monitoring in Velazquez would have been the extension of known wideband capture techniques and would |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
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| | have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring in television systems, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones the Full Band Capture Chip System was designed to capture. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining the Full Band Capture Chip System and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Cavanagh | • Velazquez and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Velazquez and DVB relate to the same and/or related field because both relate to signal processing and analysis, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
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| | including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and DVB would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Velazquez and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and ITU would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
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| Gomez | • Velazquez and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Gomez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| BCM4528 | • Velazquez and the BCM4528 chip relate to the same and/or related fields of processing received transmissions, such as satellite transmissions. Both Velazquez and the BCM4528 chip disclose satellite TV systems and processing and analyzing signals carried over satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the BCM4528 chip with Velazquez because Velazquez also discloses monitoring and rendering signals transmitted by RF and/or satellite systems.<br><br>• Capturing the entire satellite television spectrum of content would have been obvious in view of the BCM4528 chip and Velazquez and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of the BCM4528 chip and Velazquez to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
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| | • Implementing full band capture and analysis/monitoring of satellite television in Velazquez would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the BCM4528 chip.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in BCM4528. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining BCM4528 and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Currivan | • Currivan and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Currivan and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire television spectrum of content would have been obvious in view of Velazquez and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would have been obvious in view of Currivan because the receiver components and techniques disclosed in each are similar. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
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| | • Combining Currivan and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Tang | • Tang and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Tang and Velazquez relate to monitoring and analysis of wideband signals and both disclose adaptive receivers that digitize received signals.<br><br>• Capturing and analyzing the entire television spectrum of content would have been obvious in view of Velazquez and Tang and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Tang to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television would have been obvious in view of Tang because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Tang and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Sadja | • Velazquez and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
|---|---|
| | captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion and channelizing with Sadja's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Velazquez and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Velazquez and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Velazquez |
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| | analyzing/reporting signal quality with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Lee | • Velazquez and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Velazquez and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality and adjusting based on the analysis with Velazquez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Velazquez and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |

### f. Combinations Based on Petrovic

To the extent Petrovic does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Petrovic with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| Maycock | • Maycock and Petrovic relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
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| | both Maycock and Petrovic relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Petrovic and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Petrovic and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Petrovic would have been the application of known techniques to similar products/systems.<br><br>• Combining Maycock and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Petrovic and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Petrovic and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Velazquez and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | have been obvious in view of Petrovic because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Velazquez and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Petrovic and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. Additionally, both Coyne and Petrovic relate to monitoring and analysis of received content, including satellite transmitted content. For example, it would have been obvious to combine the techniques disclosed in Coyne for satellite communications with Petrovic because Petrovic also discloses satellite systems, including satellite TV systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Coyne and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Coyne and Petrovic to capture, channelize, analyze and report on the full spectrum of received satellite TV content would have been a logical extension of the existing and described techniques.<br><br>• The combination of Coyne and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Coyne would have been the application of known techniques (e.g., monitoring |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | transmission of media content) to known products/systems to yield predictable results. |
| Flask | • Petrovic and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Flask would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Caporizzo | • Petrovic and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Caporizzo would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| Full Band Capture Chip System | • Petrovic and the Full Band Capture Chip System relate to the same and/or related fields of processing television transmissions. Both Petrovic and the Full Band Capture Chip System disclose cable TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the Full Band Capture Chip System with Petrovic because Petrovic also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Petrovic would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Petrovic. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining the Full Band Capture Chip System and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| Cavanagh | • Petrovic and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Cavanagh would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| ITU | • Petrovic and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and ITU would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| DVB | • Petrovic and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and DVB would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Gomez | • Petrovic and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to monitoring transmission of media content with Petrovic's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Petrovic and Gomez would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| BCM4528 | • Petrovic and the BCM4528 chip relate to the same and/or related fields of processing television transmissions, including satellite TV. Both Petrovic and the BCM4528 chip disclose satellite TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
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| | techniques implemented and/or disclosed in the BCM4528 chip with Petrovic because Petrovic also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the BCM4528 chip and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of the BCM4528 chip and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Petrovic would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the BCM4528 chip.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Petrovic. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining BCM4528 and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Currivan | • Petrovic and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Petrovic and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | • Capturing the entire spectrum of content would have been obvious in view of Petrovic and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Petrovic and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Petrovic and Currivan would have been the application of known techniques to similar products/systems.<br><br>• Combining Currivan and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Tang | • Petrovic and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Petrovic and Tang relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Petrovic and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Petrovic relating to monitoring, capturing, analyzing and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | reporting on broadcasted signals to determine the use and failure to use particular content.<br><br>• Combining Tang and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Carney | • Petrovic and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • Petrovic and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Petrovic and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Petrovic and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Petrovic's system for digitizing, monitoring, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | • Combining Petrovic and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Pugel '520 | • Petrovic and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Petrovic and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • Petrovic and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Petrovic and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Petrovic |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • Petrovic and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • Petrovic and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Petrovic and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Petrovic's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Petrovic and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

### g. Combinations Based on Full Band Capture Chip System

To the extent the Full Band Capture Chip System does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine the Full Band Capture Chip System with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| Coyne | • Coyne and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Coyne and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving, digitizing, and monitoring full spectrum) to known products/systems to yield predictable results. |
| Maycock | • Maycock and the Full Band Capture Chip System relate to the same and/or related fields of processing television transmissions. Both Maycock and the Full Band Capture Chip System disclose cable TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | Full Band Capture Chip System with Maycock because Maycock also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Maycock would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Maycock. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining Maycock and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • The Full Band Capture Chip System and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum and/or satellite signals. Additionally, both the Full Band Capture Chip System and Velazquez relate to monitoring and analysis of wideband signals and both |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | disclose receivers that digitize received signals and disclose satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Velazquez and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Velazquez to capture, channelize, analyze and report on the full spectrum of a received television spectrum would have been a logical extension of the existing and described techniques.<br><br>• Implementing television full band capture and analysis/monitoring in Velazquez would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring in television systems, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones the Full Band Capture Chip System was designed to capture. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining Velazquez and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Broadcom Full Band Capture Chip System and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and Flask would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Caporizzo | • Broadcom Full Band Capture Chip System and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and Caporizzo would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Petrovic | • Petrovic and the Full Band Capture Chip System relate to the same and/or related fields of processing television |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | transmissions. Both Petrovic and the Full Band Capture Chip System disclose cable TV systems and processing and analyzing signals carried over cable networks and/or satellite systems. For example, it would have been obvious to combine the techniques implemented and/or disclosed in the Full Band Capture Chip System with Petrovic because Petrovic also discloses monitoring and rendering video signals transmitted by cable and/or satellite systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of the Full Band Capture Chip System and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Full Band Capture Chip System and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Implementing full band capture and analysis/monitoring in Petrovic would have been the extension of known wideband capture techniques and would have had predictable results, especially in view of the Full Band Capture Chip System.<br><br>• It was obvious to try to implement full band capture and analysis/monitoring, and a POSITA would have had an expectation of success in extending the capabilities of existing systems to capture, digitize, and analyze the entire received spectrum of a television signal, such as the ones disclosed in Petrovic. Full band capture allowed for advantages such as quicker channel switching and display, for example in a household watching and switching between channels on multiple displays/televisions simultaneously.<br><br>• Combining Petrovic and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Cavanagh | • Broadcom Full Band Capture Chip System and Cavanagh relate to the same and/or related field because both relate to |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and Cavanagh would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results.<br><br>• Combining the Full Band Capture Chip System and Cavanagh would have further been obvious because both came from Broadcom and relate to digitizing and capturing received television content. |
| ITU | • Broadcom Full Band Capture Chip System and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | • Combining Broadcom Full Band Capture Chip System and ITU would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| DVB | • Broadcom Full Band Capture Chip System and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving and monitoring full spectrum with Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and DVB would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Gomez | • Broadcom Full Band Capture Chip System and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Broadcom Full Band Capture Chip System and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving and monitoring full spectrum with Broadcom |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Broadcom Full Band Capture Chip System and Gomez would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Currivan | • The Full Band Capture Chip System and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both the Full Band Capture Chip System and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and the Full Band Capture Chip System and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and the Full Band Capture Chip System to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining the Full Band Capture Chip System and Currivan would have been the application of known techniques to similar products/systems.<br><br>• Combining Currivan and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Tang | • The Full Band Capture Chip System and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both the Full Band |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | Capture Chip System and Tang relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and the Full Band Capture Chip System and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and the Full Band Capture Chip System to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining the Full Band Capture Chip and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and the Full Band Capture Chip relating to digitizing an entire television spectrum and then analyzing and reporting on received signals. |
| BCM4528 | • It would have been obvious to combine the disclosures of the Full Band Capture Chip System and the BCM4528 to apply the teachings to satellite television because both relate to the same and/or related fields of receiving, digitizing and processing full television spectrums arriving at a receiver. Specifically, the Full Band Capture Chip System specifically discloses capturing an entire cable TV spectrum of channels, while the BCM4528 chip discloses the same technique for satellite TV transmissions.<br><br>• A POSITA further would have been motivated to combine Full Band Capture Chip System and the BCM4528 because both involved chips from the same company (Broadcom) that perform similar functions (capturing an entire television spectrum).<br><br>• Incorporating signal analysis and reporting, such as in DOCSIS 3.0 in the Full Band Capture Chip System, into a satellite system would have provided expected and advantageous results. Such a combination would have been |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | the application of known techniques to the similar products/systems.<br><br>• Combining BCM4528 and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Sadja | • Broadcom Full Band Capture Chip System and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of the Broadcom Full Band Capture Chip System and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of the Broadcom Full Band Capture Chip System with respect to analog-to-digital conversion and channelizing with Sadja's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining the Broadcom Full Band Capture Chip System and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Broadcom Full Band Capture Chip System and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of the Broadcom Full Band Capture Chip System and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of the Broadcom Full Band Capture Chip System with respect to analog-to-digital conversion and channelizing with the Yu's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining the Broadcom Full Band Capture Chip System and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Broadcom Full Band Capture Chip System and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of the Broadcom Full Band Capture Chip System and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with the Broadcom Full Band Capture Chip System for digitizing, channelizing, and analyzing received signals.<br><br>• Combining the Broadcom Full Band Capture Chip System and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Lee | • Broadcom Full Band Capture Chip System and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of RF and/or satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with the Full Band Capture Chip System |
|---|---|
| | • The combination of the Broadcom Full Band Capture Chip System and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality and adjusting based on the analysis with the Broadcom Full Band Capture Chip System's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining the Broadcom Full Band Capture Chip System and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |

**h. Combinations Based on Cavanagh**

To the extent Cavanagh does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Cavanagh with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| Coyne | • Cavanagh and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | received spectrum with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Cavanagh and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Cavanagh and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Cavanagh and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Cavanagh and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Cavanagh and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Cavanagh and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | monitoring full spectrum with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| ITU | • Cavanagh and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Cavanagh and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | • Combining Cavanagh and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Cavanagh and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Cavanagh and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Cavanagh's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | • Combining Cavanagh and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Cavanagh and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Sadja | • Cavanagh and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Cavanagh and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Cavanagh and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Cavanagh |
|---|---|
| Lee | • Cavanagh and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • Cavanagh and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Cavanagh and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Cavanagh's system for receiving and analyzing signals.<br><br>• Combining Cavanagh and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

### i. Combinations Based on ITU

To the extent ITU does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine ITU with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| Coyne | • ITU and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • ITU and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • ITU and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • ITU and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • ITU and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • ITU and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • ITU and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • ITU and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | monitoring/measuring qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • ITU and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • ITU and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | qualities of a full spectrum band with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • ITU and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • ITU and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with ITU's system for digitizing, channelizing, and analyzing received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | • Combining ITU and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Carney | • ITU and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • ITU and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | channelizing) to known products/systems to yield predictable results. |
| Yu | • ITU and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • ITU and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| Pugel '520 | • ITU and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • ITU and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • ITU and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • ITU and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of ITU and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with ITU's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining ITU and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • ITU and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture. |

| Reference to Combine | Exemplary Motivation(s) to Combine with ITU |
|---|---|
| | • The combination of ITU and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with ITU's system for receiving and analyzing signals.<br><br>• Combining ITU and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**j. Combinations Based on DVB**

To the extent DVB does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine DVB with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| Coyne | • DVB and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | spectrum) to known products/systems to yield predictable results. |
| Maycock | • DVB and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • DVB and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| Caporizzo | • DVB and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • DVB and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • DVB and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
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| | including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • DVB and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • DVB and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • DVB and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • DVB and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • DVB and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • DVB and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Carney | • DVB and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • DVB and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
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| | • The combination of DVB and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • DVB and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • DVB and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Pugel '520 | • DVB and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • DVB and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • DVB and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • DVB and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of DVB and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with |

| Reference to Combine | Exemplary Motivation(s) to Combine with DVB |
|---|---|
| | DVB's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining DVB and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • DVB and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of DVB and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with DVB's system for receiving and analyzing signals.<br><br>• Combining DVB and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full-band capture technology) to known products/systems to yield predictable results. |

**k. Combinations Based on Gomez**

To the extent Gomez does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Gomez with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| Coyne | • Gomez and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | • The combination of Gomez and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Gomez and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Gomez and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | • The combination of Gomez and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Gomez and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Gomez and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Gomez and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture Chip System | • Gomez and Broadcom Full Band Capture Chip System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Broadcom Full Band Capture Chip System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture Chip System with respect to receiving and monitoring full spectrum with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Broadcom Full Band Capture Chip System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Gomez and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Gomez and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Gomez and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Currivan | • Gomez and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | respect to receiving and measuring/analyzing a full received spectrum with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Gomez and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Chen '010 | • Gomez and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | analyzing/reporting signal quality with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| McNeely | • Gomez and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Gomez and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Gomez's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Gomez and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| BCM4528 Announcement | • Gomez and BCM4528 Announcement relate to the same field of satellite television reception, processing, and display. Both reference discuss aspects of receiving and tuning satellite television, with BCM4528 providing more specific disclosures regarding a chip capable of full-band capture.<br><br>• The combination of Gomez and BCM4528 Announcement would have yielded predictable and desirable results of being able to capture and analyze an entire received spectrum of content. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement regarding full-band capture technology with Gomez's system for receiving and analyzing signals.<br><br>• Combining Gomez and BCM4528 Announcement would have been the application of known techniques (*e.g.*, full- |

| Reference to Combine | Exemplary Motivation(s) to Combine with Gomez |
|---|---|
| | band capture technology) to known products/systems to yield predictable results. |

### l. Combinations Based on Currivan

To the extent Currivan does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Currivan with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| Maycock | • Maycock and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Maycock and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Currivan would have been the application of known techniques (e.g., analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Petrovic and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both Petrovic and Currivan relate to monitoring and analysis |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Petrovic and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Petrovic and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Petrovic and Currivan would have been the application of known techniques to similar products/systems.<br><br>• Combining Currivan and Petrovic would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Currivan and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Currivan and Velazquez relate to monitoring and analysis of wideband signals and both disclose receivers that digitize received signals.<br><br>• Capturing the entire television spectrum of content would have been obvious in view of Velazquez and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Applying the systems and techniques disclosed in Velazquez to television, such as satellite and/or cable systems would |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
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| | have been obvious in view of Currivan because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Currivan and Velazquez would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Currivan and Coyne relate to the same and/or related field because both relate to signal processing and analysis and specifically both disclose satellite systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. Additionally, both Currivan and Coyne relate to monitoring and analysis of received content, including satellite transmitted content. For example, it would have been obvious to combine the techniques disclosed in Coyne for satellite communications with Currivan because Currivan discloses satellite TV systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Coyne and Currivan and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Coyne and Currivan to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• The combination of Coyne and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Currivan would have been the application of known techniques (*e.g.*, receiving and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
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| | measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Flask | • Currivan and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and Flask would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Caporizzo | • Currivan and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and Currivan would have been the application of known techniques (*e.g.*, receiving and |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
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| | measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Full Band Capture Chip System | • The Full Band Capture Chip System and Currivan relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast, cable television, and/or satellite television systems. Additionally, both the Full Band Capture Chip System and Currivan relate to monitoring and analysis of received content, including television and/or transmitted video content.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and the Full Band Capture Chip System and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and the Full Band Capture Chip System to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining the Full Band Capture Chip System and Currivan would have been the application of known techniques to similar products/systems.<br><br>• Combining the Full Band Capture Chip System and Currivan would have further been obvious because both came from Broadcom and relate to digitizing and capturing received television content.<br><br>• Combining Currivan and the Full Band Capture Chip System would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Cavanagh | • Currivan and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
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| | • The combination of Currivan and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and Cavanagh would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| ITU | • Currivan and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and ITU would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| DVB | • Cavanagh and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Cavanagh and DVB would have yielded predictable and desirable results of digitizing, channelizing, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
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| | analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Cavanagh's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Cavanagh and DVB would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Currivan and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving and measuring/analyzing a full received spectrum with Currivan's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Currivan and Gomez would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Currivan and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Tang and Currivan relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and Tang and would have |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
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| | yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and Tang to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Currivan and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Currivan relating to analysis/monitoring and display of received television signals.<br><br>• Combining Currivan and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| BCM4528 | • It would have been obvious to combine the disclosures of the Currivan and the BCM4528 to apply the teachings to satellite television because both relate to the same and/or related fields of receiving, digitizing and processing full television spectrums arriving at a receiver. Specifically, Currivan specifically discloses capturing a received TV spectrum of channels, while the BCM4528 chip discloses the same technique for satellite TV transmissions.<br><br>• A POSITA further would have been motivated to combine Currivan and the BCM4528 because both involved chips from the same company (Broadcom) that perform similar functions (capturing and analyzing television spectrum).<br><br>• Incorporating signal analysis and reporting, such as in DOCSIS 3.0 in the Full Band Capture Chip System, into a satellite system would have provided expected and advantageous results. Such a combination would have been the application of known techniques to the similar products/systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
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| | • Combining Currivan and BCM4528 would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Carney | • Currivan and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Currivan system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • Currivan and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Currivan and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Currivan and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| Pugel '520 | • Currivan and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Currivan and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • Currivan and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Currivan and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • Currivan and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Currivan |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • Currivan and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Currivan and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Currivan's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Currivan and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

**m. Combinations Based on Tang**

To the extent Tang does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to

combine Tang with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| Maycock | • Maycock and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Maycock and Currivan relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and Maycock and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and Maycock to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Maycock and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Maycock relating to analysis/monitoring and display of received television signals.<br><br>• Combining Maycock and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Petrovic and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Petrovic and Currivan relate to monitoring and analysis of received transmissions in television systems. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | • Capturing the entire spectrum of content would have been obvious in view of Tang and Petrovic and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and Petrovic to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining Petrovic and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Maycock relating to monitoring, capturing, analyzing and reporting on broadcasted signals to determine the use and failure to use particular content.<br><br>• Combining Petrovic and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Tang and Velazquez relate to the same and/or related field because both relate to signal processing, e.g. for analog wideband signals received via RF spectrum. Additionally, both Tang and Velazquez relate to monitoring and analysis of wideband signals and both disclose adaptive receivers that digitize received signals.<br><br>• Capturing and analyzing the entire television spectrum of content would have been obvious in view of Velazquez and Tang and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Velazquez and Tang to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | • Applying the systems and techniques disclosed in Velazquez to television would have been obvious in view of Tang because the receiver components and techniques disclosed in each are similar.<br><br>• Combining Petrovic and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Coyne | • Tang and Coyne relate to the same and/or related field because both relate to signal processing and analysis and specifically both disclose sensing to determine which channels are receiving signals/carrying content. Tang and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Additionally, both Tang and Coyne relate to monitoring and analysis of received content. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Coyne and Tang and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Coyne and Tang to capture, channelize, analyze and report on a full television spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• The combination of Tang and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Coyne's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Coyne and Tang would have been the application of known techniques (*e.g.*, analog-to-digital conversion, |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
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| | channelizing, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Flask | • Tang and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and Flask would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Caporizzo | • Tang and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and Caporizzo would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| Full Band Capture Chip System | • The Full Band Capture Chip System and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both the Full Band Capture Chip System and Tang relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Tang and the Full Band Capture Chip System and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Tang and the Full Band Capture Chip System to capture, channelize, analyze and report on the full spectrum of received content would have been a logical extension of the existing and described techniques.<br><br>• Combining the Full Band Capture Chip System and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and the Full Band Capture Chip System relating to digitizing an entire television spectrum and then analyzing and reporting on received signals.<br><br>• Combining the Full Band Capture Chip and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Cavanagh | • Tang and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and Cavanagh would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| ITU | • Tang and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and ITU would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| DVB | • Tang and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to spectrum analysis and reporting with Tang's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and DVB would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Gomez | • Tang and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to spectrum analysis and reporting with Tang's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Tang and Gomez would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| Currivan | • Currivan and Tang relate to the same and/or related field because both relate to signal processing and analysis and specifically both relate to television broadcast systems, including without limitation sensing received signals. Additionally, both Tang and Currivan relate to monitoring and analysis of received transmissions in television systems.<br><br>• Capturing the entire spectrum of content would have been obvious in view of Currivan and Tang and would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. Combining the disclosures of Currivan and Tang to capture, channelize, analyze and report on the full spectrum of received content |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | would have been a logical extension of the existing and described techniques.<br><br>• Combining Currivan and Tang would have been the application of known techniques to similar products/system, with Tang relating to cognitive sensing and data transmission in television systems to identify which parts of the band are white space and do not have received television channels, and Currivan relating to analysis/monitoring and display of received television signals. |
| BCM4528 | • It would have been obvious to combine the disclosures of the Tang and the BCM4528 to apply the teachings to satellite television because both relate to the same and/or related fields of receiving, digitizing and processing full television spectrums arriving at a receiver. Specifically, Tang specifically discloses monitoring and capturing a received TV spectrum of channels, while the BCM4528 chip discloses a similar technique for satellite TV transmissions.<br><br>• A POSITA further would have been motivated to combine Tang and the BCM4528 because both involved chips from the same company (Broadcom) that perform similar functions (capturing and analyzing television spectrum).<br><br>• Incorporating signal analysis and reporting, such as in DOCSIS 3.0 in the Full Band Capture Chip System, into a satellite system would have provided expected and advantageous results. Such a combination would have been the application of known techniques to the similar products/systems.<br><br>• Combining the BCM4528 and Tang would have been the application of known techniques (e.g., analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Carney | • Tang and Carney relate to the same and/or related field because both relate to signal processing and analysis, including in the c television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | • The combination of Tang and Carney would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Carney with respect to analog-to-digital conversion and channelizing with Tang system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Carney would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Sadja | • Tang and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Tang and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Tang and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Pugel '520 | • Tang and Pugel '520 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Pugel '520 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Pugel '520 with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Tang and Pugel '520 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Zhang | • Tang and Zhang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Zhang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Zhang with respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals<br><br>• Combining Tang and Zhang would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| McNeely | • Tang and McNeely relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and McNeely would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of McNeely with respect to analog-to-digital conversion and channelizing with |

| Reference to Combine | Exemplary Motivation(s) to Combine with Tang |
|---|---|
| | Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and McNeely would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '760 | • Tang and Chen '760 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Tang and Chen '760 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '760 with respect to analog-to-digital conversion and channelizing with Tang's system for digitizing, monitoring, and analyzing received signals.<br><br>• Combining Tang and Chen '760 would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |

**n. Combinations Based on Renken**

To the extent Renken does not anticipate and/or render obvious on its own any of the Asserted Claims of the '008 patent, a person of ordinary skill in the art would have been motivated to combine Renken with the following other references, for the reasons noted in the chart below, as well as for the reasons described throughout this Section:

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| Coyne | • Renken and Coyne relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Coyne would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Coyne with respect to digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Coyne would have been the application of known techniques (*e.g.*, digitizing, channelizing, and analyzing and reporting on the analysis of the entire received spectrum) to known products/systems to yield predictable results. |
| Maycock | • Renken and Maycock relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Maycock would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Maycock with respect to analog-to-digital conversion and monitoring/reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Maycock would have been the application of known techniques (*e.g.*, analog-to-digital conversion and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Flask | • Renken and Flask relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Flask would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Flask with respect to measuring and reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Flask would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Caporizzo | • Renken and Caporizzo relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Caporizzo would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Caporizzo with respect to measuring and reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Caporizzo would have been the application of known techniques (*e.g.*, measuring and reporting qualities of a signal) to known products/systems to yield predictable results. |
| Velazquez | • Renken and Velazquez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | • The combination of Renken and Velazquez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Velazquez with respect to analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Velazquez would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and measuring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Petrovic | • Renken and Petrovic relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Petrovic would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Petrovic with respect to monitoring transmission of media content with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Petrovic would have been the application of known techniques (*e.g.*, monitoring transmission of media content) to known products/systems to yield predictable results. |
| Broadcom Full Band Capture System | • Renken and Broadcom Full Band Capture System relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | • The combination of Renken and Broadcom Full Band Capture System would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Broadcom Full Band Capture System with respect to receiving and monitoring full spectrum with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Broadcom Full Band Capture System would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Cavanagh | • Renken and Cavanagh relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Cavanagh would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Cavanagh with respect to analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Cavanagh would have been the application of known techniques (*e.g.*, analog-to-digital conversion, channelizing, and monitoring/measuring qualities of a signal) to known products/systems to yield predictable results. |
| ITU | • Renken and ITU relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals. |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | • The combination of Renken and ITU would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of ITU with respect to monitoring, measuring, and reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and ITU would have been the application of known techniques (*e.g.*, monitoring, measuring, and reporting qualities of a signal) to known products/systems to yield predictable results. |
| DVB | • Renken and DVB relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and DVB would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DVB with respect to receiving, channelizing, and monitoring/reporting qualities of a signal with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and DVB would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a signal) to known products/systems to yield predictable results. |
| Gomez | • Renken and Gomez relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Gomez would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Gomez with respect to receiving, channelizing, and monitoring/reporting qualities of a full spectrum band with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Gomez would have been the application of known techniques (*e.g.*, receiving, channelizing, and monitoring/reporting qualities of a full spectrum band) to known products/systems to yield predictable results. |
| Currivan | • Renken and Currivan relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Currivan would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Currivan with respect to receiving and measuring/analyzing a full received spectrum with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Currivan would have been the application of known techniques (*e.g.*, receiving and measuring/analyzing a full received spectrum) to known products/systems to yield predictable results. |
| Tang | • Renken and Tang relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Tang would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Tang with respect to spectrum analysis and reporting with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Tang would have been the application of known techniques (*e.g.*, spectrum analysis and reporting) to known products/systems to yield predictable results. |
| DOCSIS | • Renken and DOCSIS relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and DOCSIS would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of DOCSIS with respect to measuring and reporting signal characteristics with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and DOCSIS would have been the application of known techniques (*e.g.*, measuring and reporting signal characteristics) to known products/systems to yield predictable results.<br><br>• Combining Renken and DOCSIS would have been obvious to a POSITA because Renken cites to and applies the DOCSIS standards throughout its disclosure. |
| BCM4528 Announcement | • Renken and BCM4528 Announcement relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and BCM4528 Announcement would have yielded predictable and desirable results of |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of BCM4528 Announcement with respect to receiving and monitoring full spectrum with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and BCM4528 Announcement would have been the application of known techniques (*e.g.*, receiving and monitoring full spectrum) to known products/systems to yield predictable results. |
| Sadja | • Renken and Sadja relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Sadja would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Sadja with respect to analog-to-digital conversion and channelizing with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Sadja would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Yu | • Renken and Yu relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Yu would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Yu with respect to analog-to-digital conversion and channelizing with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Yu would have been the application of known techniques (*e.g.*, analog-to-digital conversion and channelizing) to known products/systems to yield predictable results. |
| Chen '010 | • Renken and Chen '010 relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Chen '010 would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Chen '010 with respect to channelizing and analyzing/reporting signal quality with Renken's system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Chen '010 would have been the application of known techniques (*e.g.*, channelizing and analyzing/reporting signal quality) to known products/systems to yield predictable results. |
| Lee | • Renken and Lee relate to the same and/or related field because both relate to signal processing and analysis, including in the context of cable and/or satellite television systems. Both references discuss aspects of receiving, monitoring, analyzing, and displaying received signals.<br><br>• The combination of Renken and Lee would have yielded predictable and desirable results of digitizing, channelizing, analyzing and reporting on the analysis of the entire received spectrum of content, allowing for the full spectrum to be captured and analyzed. For example, a POSITA would have been motivated to combine the disclosure of Lee with respect to monitoring and reporting signal quality with Renken's |

| Reference to Combine | Exemplary Motivation(s) to Combine with Renken |
|---|---|
| | system for digitizing, channelizing, and analyzing received signals.<br><br>• Combining Renken and Lee would have been the application of known techniques (*e.g.*, monitoring and reporting signal quality) to known products/systems to yield predictable results. |

**4. Secondary Considerations**

A patentee bears the burden of production with respect to evidence of secondary considerations of non-obviousness. *ZUP, LLC v. Nash Mfg., Inc.*, 896 F.3d 1365, 1373 (Fed. Cir. 2018). As of the date of these Invalidity Contentions, Plaintiff has not identified any secondary considerations of non-obviousness. Defendants reserve all rights to respond to any secondary considerations of non-obviousness raised by Plaintiff, including by updating, modifying, and/or adding to these Invalidity Contentions. Defendants are not aware of any unexpected results (none is mentioned in the Asserted Patents or their file history), long felt need, commercial success (or any nexus to any allegedly successful commercial embodiment), or awards for the Asserted Patents. Indeed, as shown in these Invalidity Contentions, dozens of other companies and individuals described, built, and/or patented the exact same concepts in the Asserted Patents before Plaintiff ever did—often many years before. Even where others' inventions occurred at approximately the same time as the alleged invention in the Asserted Patents, such simultaneous invention further demonstrates the obviousness of the Asserted Patents.

## VII. P.R. 3-3(c) – CLAIM CHARTS

The attached claim charts (Exhibits A1–C14 and Appendices A–C) are based, in whole or in part, on Plaintiff's asserted theories of infringement in this case, to the extent discernible from Plaintiff's Infringement Contentions. As an initial matter, all portions of each prior art reference cited in each of the attached claim charts are relied upon to support the disclosure of each patent

claim limitation, as all portions provide general support. Representative descriptions and supporting citations are nevertheless provided, but are merely exemplary; they do not necessarily reflect every instance where a particular claim term or claim limitation may be disclosed in or taught by the prior art reference. References to figures or drawings refer to the figures/drawings themselves, as well as to any accompanying text or text necessary to understand the figures or drawings. References to text refers to the text itself, as well as the accompanying figures or drawings that accompany the text. Defendants reserve the right to rely on additional, or different, portions of the prior art references, other publications and expert testimony to establish what these references would have taught one of ordinary skill in the art, or in what manner they would have motivated a particular combination of references. Defendants reserve the right to rely on any and all documents that describe or relate to prior art systems, including relying on the system itself. Defendants also reserve the right to rely on the testimony of the authors, named inventors, or anyone else with knowledge of the prior art references and systems identified herein, as well as expert testimony regarding any such references or systems.

## VIII. P.R. 3-3(d) – INVALIDITY UNDER 35 U.S.C. § 112

Defendants provide the following grounds for invalidity under 35 U.S.C. § 112, ¶¶ 1–2. Defendants' investigation of the Asserted Patents is ongoing, and Defendants reserve the right to amend or supplement these disclosures based on further investigation and in a manner consistent with the Federal Rules of Civil Procedure, the Local Patent Rules for the Eastern District of Texas, and the Docket Control Order, or otherwise in accordance with any order or direction of this Court or agreement of the parties. Further, Plaintiff's Infringement Contentions fail to provide sufficient detail to fully understand its proposed application of the Asserted Claims, and Defendants reserve the right to assert additional grounds for invalidity under 35 U.S.C. § 112 in response to Plaintiff's claim interpretations. Defendants also reserve the right to supplement, modify, or otherwise

amend these grounds for invalidity under 35 U.S.C. § 112 based on the Court's claim construction rulings or opinions or the parties' positions or arguments taken in connection with the claim construction process.

In addition, Defendants identify claims below that are indefinite under 35 U.S.C. § 112 ¶ 2, which Defendants will more fully address these grounds as part of claim construction.[12] Defendants reserve the right to provide additional explanation and/or argument for their Invalidity Contentions under Section 112, including, for example, based on expert testimony.

## A. '576 Patent

### 1. Indefiniteness

The Asserted Claims of the '576 patent are invalid as set forth below under 35 U.S.C. § 112, ¶ 2 for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the alleged invention. For example, the scope of the following claim terms is not reasonably certain, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid as indefinite:

#### a. "communicating a transponder request signal to the ODU from the IRD" (claim 14)

The scope of the term "communicating a transponder request signal to the ODU from the IRD" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a transponder request signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "communicating a transponder request signal to the ODU from the IRD."

[12] Any dependent claim is invalid if it depends, directly or indirectly, on another claim that is invalid under 35 U.S.C. § 112.

**b. "in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received digitized satellite broadband signals, wherein the selecting is responsive to the transponder request signals" (claim 14)**

The scope of the term "in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received digitized satellite broadband signals, wherein the selecting is responsive to the transponder request signals" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as a "plurality of satellite broadband signals," "a plurality of transponder signals," and "selecting is responsive to the transponder request signals," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received digitized satellite broadband signals, wherein the selecting is responsive to the transponder request signals."

**c. "combining extracted selected transponder signals into a composite signal" (claim 14)**

The scope of the term "combining extracted selected transponder signals into a composite signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "extracted selected transponder signals," and "a composite signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "combining extracted selected transponder signals into a composite signal."

**d. "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting" (claim 14)**

The scope of the term "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting," such as by providing examples. And "the IRDs" lacks an antecedent basis. It is not reasonably certain to a person of ordinary skill what constitutes "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting."

**e. "filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal" (claims 15)**

The scope of the term "filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a transponder signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal."

**f. "comprises frequency translating the selected and extracted transponder channels to a variable [or predetermined] frequency before combining" and similar limitations (claims 16, 17, 21)**

The scope of the term "comprises frequency translating the selected and extracted transponder channels to a variable [or predetermined] frequency before combining" in claims 16 and 17 (and a similar limitation in claim 21) is indefinite in view of the intrinsic record including

the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as a "transponder channel," "a variable frequency" and "a predetermined frequency," such as by providing examples. Additionally, the "transponder channel" lacks an antecedent basis. It is not reasonably certain to a person of ordinary skill what constitutes "comprises frequency translating the selected and extracted transponder channels to a variable [or predetermined] frequency before combining."

**g. "splitting the composite signal inside a home and distributing to a plurality of IRDs" (claims 18, 21)**

The scope of the term "splitting the composite signal inside a home and distributing to a plurality of IRDs" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the composite signal inside a home," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "splitting the composite signal inside a home and distributing to a plurality of IRDs."

**h. "wherein the transponder request signal is transmitted over a wireless link to the ODU" (claims 20, 23)**

The scope of the term "wherein the transponder request signal is transmitted over a wireless link to the ODU" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the transponder request signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the transponder request signal is transmitted over a wireless link to the ODU."

**i. "wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal" (claim 34)**

The scope of the term "wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the digitized broadband signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal."

**j. "converting the selected signal to an analog signal using a digital to analog converter prior to combining" (claim 35)**

The scope of the term "converting the selected signal to an analog signal using a digital to analog converter prior to combining" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the selected signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "converting the selected signal to an analog signal using a digital to analog converter prior to combining."

**k. "wherein the combining is performed in the digital domain" (claim 36)**

The scope of the term "wherein the combining is performed in the digital domain" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "combining . . . in the digital domain," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the combining is performed in the digital domain."

**l. "wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency" (claim 37)**

The scope of the term "wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a digital mixer," "a rotating phasor," and "the data samples," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency."

**m. "frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" (claim 38)**

The scope of the term " frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the digitized broadband signal" and "transponder signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes " frequency translating the digitized broadband signal prior to selecting and extracting transponder signal."

**n. "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" (claim 39)**

The scope of the term "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the original digitized broadband signal," "a selected transponder channel," and "baseband," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes

"wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband."

**o. "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" (claim 40)**

The scope of the term "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a channel translation table," "assigned frequency slots," "transponder channels," and "the composite signal," such as by providing examples. Additionally, the "transponder channels" lacks an antecedent basis. It is not reasonably certain to a person of ordinary skill what constitutes "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal."

**p. "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel" (claim 41)**

The scope of the term "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the channel translation table," and "a desired selected translated transponder channel," such as by providing examples. Additionally, the "transponder channel" lacks an antecedent basis. It is not reasonably certain to a person of ordinary skill what constitutes "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel."

**q. "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels" (claim 42)**

The scope of the term "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels" is indefinite in view of the intrinsic record including the specification of the '576 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the translated digitized broadband signal" and "non-selected transponder channels," such as by providing examples. Additionally, "substantially removing signal information" is indefinite as it is a term of degree and does not inform, with reasonable certainty, the scope of the invention. It is not reasonably certain to a person of ordinary skill what constitutes "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels."

* * *

In view of the specification and file history of the Asserted Patent, the above terms (and any other similar terms in any of the Asserted Claims) fail to inform those skilled in the art about the scope of the invention with reasonable certainty. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014) (holding that "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention"). As such, the asserted claims identified above are invalid for being indefinite. *See id.*

**2. Lack of Written Description and/or Enablement**

The Asserted Claims of the '576 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112, ¶ 1. For example, the specification of

the '576 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid:

**a. "transponder request signal(s)" / "transponder signal(s)"**

| Claim Term | Asserted Claims |
|---|---|
| "communicating a transponder request signal to the ODU from the IRD" | 14 |
| "in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received digitized satellite broadband signals, wherein the selecting is responsive to the transponder request signals" | 14 |
| "combining extracted selected transponder signals into a composite signal" | 14 |
| "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting" | 14 |
| "filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal" | 15 |
| "wherein the transponder request signal is transmitted over a wireless link to the ODU" | 20, 23 |
| "frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" | 38 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a transponder request signal or transponder signal. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a transponder request signal or transponder signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**b. "composite signal"**

| Claim Term | Asserted Claims |
|---|---|
| "combining extracted selected transponder signals into a composite signal" | 14 |
| "transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting" | 14 |
| "splitting the composite signal inside a home and distributing to a plurality of IRDs" | 18, 21 |
| "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" | 40 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a composite signal. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a composite signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**c. "transmitting the composite signal over the single cable to the IRDs"**

| Claim Term | Asserted Claims |
|---|---|
| "transmitting the composite signal over the single cable to the IRDs," | 14 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue

experimentation, to practice the full scope of this limitation. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**d. "the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting." | 14 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**e. "transponder channel(s)"**

| Claim Term | Asserted Claims |
|---|---|
| "comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining" | 16, 21 |
| "comprises frequency translating the selected and extracted transponder channels to a predetermined frequency before combining" | 17 |
| "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" | 39 |
| "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" | 40 |
| "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel" | 41 |
| "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels" | 42 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with transponder channels. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using transponder channels. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**f. "a wireless link"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein the transponder request signal is transmitted over a wireless link to the ODU" | 20, 23 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a wireless. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a wireless link. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**g. "digitized broadband signal" / "original digitized broadband signal"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal" | 34 |

| Claim Term | Asserted Claims |
|---|---|
| "frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" | 38 |
| "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" | 39 |
| "wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels" | 42 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a digitized broadband signal. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a digitized broadband signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**h. "converting the selected signal to an analog signal"**

| Claim Term | Asserted Claims |
|---|---|
| "converting the selected signal to an analog signal using a digital to analog converter prior to combining" | 35 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '576 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to convert the selected signal to an analog signal. Nor does the specification of the '576 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

### i. "frequency translating . . . "

| Claim Term | Asserted Claims |
|---|---|
| "comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining" | 16, 21 |
| "comprises frequency translating the selected and extracted transponder channels to a predetermined frequency before combining" | 17 |
| "wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency" | 37 |
| "frequency translating the digitized broadband signal prior to selecting and extracting transponder signal" | 38 |
| "wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband" | 39 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '576 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to perform frequency translating. Nor does the specification of the '576 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

### j. "channel translation table"

| Claim Term | Asserted Claims |
|---|---|
| "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" | 40 |
| "providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel" | 41 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '576 patent does not sufficiently explain how to a POSITA, without undue

experimentation, to make a channel translation table. Nor does the specification of the '576 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**k. "frequency slots"**

| Claim Term | Asserted Claims |
|---|---|
| "maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal" | 40 |

The '576 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '576 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with frequency slots. Furthermore, the specification of the '576 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using frequency slots. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

## B. '715 Patent

### 1. Indefiniteness

The Asserted Claims of the '715 patent are invalid as set forth below under 35 U.S.C. § 112, ¶ 2 for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the alleged invention. For example, the scope of the following claim terms is not reasonably certain, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid as indefinite:

**a. "a gateway in communication with the ODU and at least one set top box (STB)" (claim 9)**

The scope of the term "a gateway in communication with the ODU and at least one set top box (STB)" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a gateway," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a gateway in communication with the ODU and at least one set top box (STB)."

**b. "a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information" (claim 9)**

The scope of the term "a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "transponder signals" and "gateway," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information."

**c. "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals" (claim 9)**

The scope of the term "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "transponder signals," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals."

**d. "a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal" (claim 9)**

The scope of the term "a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a composite signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal."

**e. "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs" (claim 9)**

The scope of the term "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs" is indefinite in view of the intrinsic

record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the composite signal," "gateway," and "specific programs," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs."

**f. "wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output" (claim 10)**

The scope of the term "wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a translation table," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output."

**g. "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network" (claim 11)**

The scope of the term "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the translation table" and the "devices in the network," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the translation table is

maintained by a controller located in the gateway and the translation table is communicated to devices in the network."

**h. "wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network" (claim 12)**

The scope of the term "wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network" is indefinite in view of the intrinsic record including the specification of the '715 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "the translation table" and the "devices in the network," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network."

* * *

In view of the specification and file history of the Asserted Patent, the above terms (and any other similar terms in any of the Asserted Claims) fail to inform those skilled in the art about the scope of the invention with reasonable certainty. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014) (holding that "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention"). As such, the asserted claims identified above are invalid for being indefinite. *See id.*

**2. Lack of Written Description and/or Enablement**

The Asserted Claims of the '715 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112, ¶ 1. For example, the specification of the '576 patent does not provide sufficient written description or enablement of the aspects of the

alleged invention corresponding to following claim limitations, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid:

**a. "gateway"**

| Claim Term | Asserted Claims |
|---|---|
| "a gateway in communication with the ODU and at least one set top box (STB)" | 9 |
| "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs" | 9 |
| "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network" | 11 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '715 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a gateway. Furthermore, the specification of the '715 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a gateway. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**b. "transponder signal(s)"**

| Claim Term | Asserted Claims |
|---|---|
| "a signal selector that receives a plurality of broadband LNB signals comprising a plurality of transponder signals, the signal selector is responsive to transponder select information transmitted by the gateway and selects a plurality of transponder signals from at least one broadband LNB signal based on the transponder select information" | 9 |

| Claim Term | Asserted Claims |
|---|---|
| "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals" | 9 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '715 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with transponder signals. Furthermore, the specification of the '715 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using transponder signals. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**c. "shifting the selected transponder signals to new carrier frequencies to produce RF signals"**

| Claim Term | Asserted Claims |
|---|---|
| "a frequency translator coupled to the signal selector that is capable of shifting the selected transponder signals to new carrier frequencies to produce RF signals" | 9 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '715 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to perform shifting the selected transponder signals to new carrier frequencies to produce RF signals. Nor does the specification of the '715 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

### d. "combining at least two RF signals to produce a composite signal"

| Claim Term | Asserted Claims |
|---|---|
| "a signal combiner coupled to at least one frequency translator capable of combining at least two RF signals to produce a composite signal" | 9 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '715 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to perform combining at least two RF signals to produce a composite signal. Nor does the specification of the '715 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

### e. "decodes specific programs"

| Claim Term | Asserted Claims |
|---|---|
| "wherein the modulation of the composite signal is the same as the modulation of the broadband LNB signals and wherein the composite signal is transmitted to the gateway and the gateway receives the composite signal, decodes specific programs, and distributes the programs over a digital local area network (LAN) to STBs" | 9 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '715 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to decode specific programs. Nor does the specification of the '715 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

### f. "translation table"

| Claim Term | Asserted Claims |
|---|---|
| "wherein a translation table maps original channel locations on the selector input to new channel locations on the selector output" | 10 |
| "wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network" | 11 |
| "wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network" | 12 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '715 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a translation table. Furthermore, the specification of the '715 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a translation table. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

### g. "communicated to devices in the network"

| Claim Term | Asserted Claims |
|---|---|
| "The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the gateway and the translation table is communicated to devices in the network." | 11 |
| "The signal distribution system of claim 10 wherein the translation table is maintained by a controller located in the ODU and the translation table is communicated to devices in the network." | 12 |

The '715 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '715 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system.

Furthermore, the specification of the '715 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the context of using a translation table. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

## C. '008 Patent

### 1. Indefiniteness

The Asserted Claims of the '008 patent are invalid as set forth below under 35 U.S.C. § 112, ¶ 2 for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the alleged invention. For example, the scope of the following claim terms is not reasonably certain, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid as indefinite:

**a. "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising an plurality of television channels, said digitization resulting in a digitized signal" and similar limitations (claims 1, 3, and 11)**

The scope of the term "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising an plurality of television channels, said digitization resulting in a digitized signal" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "an analog-to-digital converter operable to digitize a received signal," "spanning an entire television spectrum," "plurality of television channels," "or digitization," such as by providing examples. It is also unclear what the "digitized signal" is, as referenced in other elements of the claims. It is not reasonably certain to a person of ordinary skill what constitutes "an analog-to-digital converter operable to digitize a received signal spanning an entire television

spectrum comprising an plurality of television channels, said digitization resulting in a digitized signal."

**a. "a signal monitor operable to" (claim 1)**

The scope of the term "a signal monitor operable to" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a signal monitor operable to," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a signal monitor operable to."

**b. "analyze said digitized signal to determine a characteristic of said digitized signal" and similar limitations (claims 1, 3, and 11)**

The scope of the term "analyze said digitized signal to determine a characteristic of said digitized signal" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "analyze said digitized signal" or "determine a characteristic of said digitized signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "analyze said digitized signal to determine a characteristic of said digitized signal."

**c. "report said determined characteristic to a source of said received signal" and similar limitations (claims 1, 3, and 11)**

The scope of the term "report said determined characteristic to a source of said received signal" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "report[ing] said determined characteristic" or a "source of said received signal," such as by providing examples. It is not

reasonably certain to a person of ordinary skill what constitutes "report said determined characteristic to a source of said received signal."

**d. "a data processor operable to process a television channel to recover content [data] carried on the television channel" and similar limitations (claims 1, 3, and 11)**

The scope of the term "a data processor operable to process a television channel to recover content [data] carried on the television channel" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a data processor operable to process," "a television channel" or "content [data] carried on the television channel," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "a data processor operable to process a television channel to recover content [data] carried on the television channel."

**e. "a channelizer operable to" (claim 1)**

The scope of the term "a channelizer operable to" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "a channelizer operable to," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes a "a channelizer operable to."

**f. "select[ing] a first portion of said digitized signal" and "select[ing] a second portion of said digitized signal" (claims 1, 3, and 11)**

The scope of the terms "select[ing] a first portion of said digitized signal" and "select[ing] a second portion of said digitized signal" are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as a "portion" of a digitized signal, such as by

providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "select[ing] a first portion of said digitized signal" and "select[ing] a second portion of said digitized signal."

**g. "concurrently output[ting] said first portion of said digitized signal to said signal monitor" and "concurrently output[ting] said second portion of said digitized signal to said data processor" (claims 1, 3, and 11)**

The scope of the term "concurrently output[ting] said first portion of said digitized signal to said signal monitor" and "concurrently output[ting] said second portion of said digitized signal to said data processor" in claim 1 (and similar limitations in claims 3 and 11) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "concurrently output[ting]" signals or outputting signals to "said signal monitor" and "said data processor," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "concurrently output[ting] said first portion of said digitized signal to said signal monitor" and "concurrently output[ting] said second portion of said digitized signal to said data processor."

**h. "said digitized signal spans said entire television spectrum" and similar limitations (claims 2, 4, and 12)**

The scope of the term "said digitized signal spans said entire television spectrum" in claim 2 (and similar limitations in claims 4 and 12) are indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "said digitized signal spans said entire television spectrum," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "said digitized signal spans said entire television spectrum."

**i. "one or more circuits" (claims 3 and 11)**

The scope of the term "one or more circuits" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "one or more circuits," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "one or more circuits."

**j. "bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carrier a plurality of channels" (claims 3 and 11)**

The scope of the term "bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carrier a plurality of channels" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carrier a plurality of channels," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carrier a plurality of channels."

**k. "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" (claim 3) / "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" (claim 11)**

The scope of the term "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" / "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" / "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal," such as by providing examples. It is not reasonably

certain to a person of ordinary skill what constitutes "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" / "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal."

**l. "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal" (claim 3) / "said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal" (claim 11)**

The scope of the term "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal" / "said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal" / "said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received

signal, and which reports said determined one or more characteristics to a source of said received signal" / "said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal."

**m. "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" (claim 3) / "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" (claim 11)**

The scope of the term "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" / "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" / "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" / "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels."

**n. "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$" (claims 4 and 12)**

The scope of the term "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$" such

as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$."

**o. "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" (claims 5 and 13)**

The scope of the term "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate."

**p. "said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels" (claims 7 and 15)**

The scope of the term "said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes

"said received signal is a satellite television signal output by a low noise block downconverter; and said plurality of channels comprises a plurality of television channels."

**q. "wherein said one or more circuits reside in a customer premises gateway" (claims 9 and 17)**

The scope of the term "wherein said one or more circuits reside in a customer premises gateway" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "reside in a customer premises gateway," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein said one or more circuits reside in a customer premises gateway."

**r. "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits" (claims 10 and 18)**

The scope of the term "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits" is indefinite in view of the intrinsic record including the specification of the '008 patent. The specification does not provide sufficient guidance regarding the scope of this term and what qualifies as "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits," such as by providing examples. It is not reasonably certain to a person of ordinary skill what constitutes "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits."

* * *

In view of the specification and file history of the Asserted Patent, the above terms (and any other similar terms in any of the Asserted Claims) fail to inform those skilled in the art about the scope of the invention with reasonable certainty. *See Nautilus, Inc. v. Biosig Instruments, Inc.*,

572 U.S. 898 (2014) (holding that "a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention"). As such, the asserted claims identified above are invalid for being indefinite. *See id.*

**2. Lack of Written Description and/or Enablement**

The Asserted Claims of the '008 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112, ¶ 1. For example, the specification of the '008 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid:

**a. "analog-to-digital converter operable to digitize . . ."**

| Claim Term | Asserted Claims |
|---|---|
| "an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels" | 1 |
| "digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" | 3 |
| "digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal" | 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the '008 patent does not sufficiently explain how a POSITA would have been able, without undue experimentation, to digitize from analog a signal spanning an entire television spectrum. Nor does the specification of the '008 patent evidence that the named inventors were in possession of this technology. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**b. "analyze said digitized signal to determine a characteristic . . ."**

| Claim Term | Asserted Claims |
|---|---|
| "analyze said digitized signal to determine a characteristic of said digitized signal" | 1 |
| "said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal" | 3, 11 |
| "wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" | 5, 13 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '008 patent does not evidence that the named inventors were in possession of the full scope of this limitation as asserted against Defendants. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, including measuring all of the recited characteristics. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**c. "report said determined characteristic to a source . . ."**

| Claim Term | Asserted Claims |
|---|---|
| "report said determined characteristic to a source of said received signal" | 1 |
| "and which reports said determined one or more characteristics to a source of said received signal" | 3, 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '008 patent does not evidence that the named inventors were in possession of the full scope of this limitation as asserted against Defendants. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to

practice the full scope of this limitation, including reporting to a "source of said received signal" in the context of a satellite system. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**d. "data processor operable to process a television channel to recover content carried on the television channel"**

| Claim Term | Asserted Claims |
|---|---|
| "data processor operable to process a television channel to recover content carried on the television channel" | 1 |
| "said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels" | 3, 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). For example, the specification of the '008 patent does not evidence that the named inventors were in possession of the full scope of this limitation as asserted against Defendants, including with respect to what "content" and "data" is recovered. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, including recovering data and/or content carried on a channel. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**e. "a channelizer operable to . . . select a first portion . . . [and] select a second portion"**

| Claim Term | Asserted Claims |
|---|---|
| "a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal" | 1 |
| "wherein said first portion of said digitized signal spans said entire television spectrum" | 2 |
| "selecting a first portion of said digitized signal; selecting a second portion of said digitized signal" | 3 |
| "wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$" | 4, 12 |

| Claim Term | Asserted Claims |
|---|---|
| "select a first portion of said digitized signal; select a second portion of said digitized signal" | 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). The specification of the '008 patent does not evidence that the named inventors were in possession of a channelizer that selects the first and second portions of a signal as required by these claims. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, including selecting one or more portions of a signal, especially where one of the portions comprises the entire television spectrum signal or *all* of a received signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**f. "concurrently output . . ."**

| Claim Term | Asserted Claims |
|---|---|
| "concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor" | 1 |
| "concurrently outputting said selected first portion and said selected second portion" | 3 |
| "concurrently output said selected first portion and said selected second portion" | 11 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). The specification of the '008 patent does not evidence that the named inventors were in possession of the ability to concurrently output first and second portions of a signal as required by these claims. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, including concurrently outputting first

and second portions of a signal as required by these claims. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**g. "wherein said one or more characteristics is one of signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein said one or more characteristics is one of signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate" | 5 and 13 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). Specifically, the '008 patent fails to provide sufficient and enabling written description regarding how to determine these characteristics, including without limitation, phaw vs. frequency, peak-to-average ratio, noise levels, bit error rate, and symbol error rate. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**h. "said received signal is a satellite television signal output by a low noise block downconverter"**

| Claim Term | Asserted Claims |
|---|---|
| "said received signal is a satellite television signal output by a low noise block downconverter" | 7, 15 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). The specification of the '008 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in the context of a satellite system, including with a low noise block downconverter. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation in the

context of using a low noise block downconverter. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

**i. "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits"**

| Claim Term | Asserted Claims |
|---|---|
| "wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits" | 10, 18 |

The '008 patent fails to provide sufficient written description or an enabling disclosure with respect to the above claim terms (and any other similar terms in any of the Asserted Claims). The specification of the '008 patent does not evidence that the named inventors were in possession of the ability to perform the claim requirements in which a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits. Furthermore, the specification of the '008 patent does not enable a POSITA, without undue experimentation, to practice the full scope of this limitation, such as by configuring a bandwidth or center frequency of a first portion of a signal. The Asserted Claims therefore do not meet the written description or enablement requirements of 35 U.S.C. § 112.

DATED: August 5, 2022

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**CERTIFICATE OF SERVICE**

I hereby certify that on August 5, 2022, the foregoing was served upon all counsel of record who have consented to electronic service.

*/s/ Nathan Curtis*
Nathan Curtis

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| Application | Document | Mailroom Date | Attorney Docket No. |
|---|---|---|---|
| 17956889 | APP.FILE.REC | 11/21/2022 | 28427US16 |

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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|---|---|---|---|
| 17/956,889 | 09/30/2022 | Madhukar Reddy | 28427US16 |

**CONFIRMATION NO. 8470**

23446
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

**PUBLICATION NOTICE**

**Title:**SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL

**Publication No.**US-2023-0068514-A1
**Publication Date:**03/02/2023

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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**From:** PAIR_eOfficeAction@uspto.gov
**Cc:** PAIR_eOfficeAction@uspto.gov
**Subject:** Private PAIR Correspondence Notification for Customer Number 23446

Mar 03, 2023 03:41:00 AM

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UNITED STATES

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|---|---|---|---|
| 17956889 | NTC.PUB | 03/02/2023 | 28427US16 |

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Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 17/956,889 | 09/30/2022 | Madhukar Reddy | 28427US16 | 8470 |

23446 7590 05/01/2023

MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

| EXAMINER |
|---|
| JACKSON, BLANE J |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 05/01/2023 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mhmpto@mcandrews-ip.com

| *Office Action Summary* | Application No. 17/956,889 | Applicant(s) Reddy et al. | |
|---|---|---|---|
| | Examiner BLANE J JACKSON | Art Unit 2644 | AIA (FITF) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☑ Responsive to communication(s) filed on 30 September 2022.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5) ☑ Claim(s) 19-38 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 19-38 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 09 September 2022 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

## DETAILED ACTION

### *Notice of Pre-AIA or AIA Status*

The present application is being examined under the pre-AIA first to invent provisions.

### *Information Disclosure Statement*

The Information Disclosure Statements filed 30 September 2022 and 17 November 2022 are made of record.

### *Double Patenting*

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The filing of a terminal disclaimer by itself is not a complete reply to a nonstatutory double patenting (NSDP) rejection. A complete reply requires that the terminal disclaimer be accompanied by a reply requesting reconsideration of the prior Office action. Even where the NSDP rejection is provisional the reply must be complete. See MPEP § 804, subsection I.B.1. For a reply to a non-final Office action, see 37 CFR 1.111(a). For a reply to final Office action, see 37 CFR 1.113(c). A request for reconsideration while not provided for in 37 CFR 1.113(c) may be filed after final for consideration. See MPEP §§ 706.07(e) and 714.13.

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The actual filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/ patents/apply/applying-online/eterminal-disclaimer

Claims 19-38 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 11490152. Although the claims at issue are not identical, they are not patentably distinct from each other because, with respect to the parent patent, he instant application comprises the same claim elements but with an addition of "wherein the plurality of desired channels are non-contiguous" in independent claims 19 and 29. However, this phrase is not new but considered an obvious condition of "the broadcast channels comprising a plurality of desired channels and a plurality of undesired channels".

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BLANE J JACKSON whose telephone number is (571)272-7890. The examiner can normally be reached 7:30-4:30 M-TH; 8-2 FRI.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathy Wang-Hurst can be reached on 571 270 5371. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more

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/BLANE J JACKSON/
Primary Examiner, Art Unit 2644

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 17/956,889 | Reddy et al. |
| | Examiner | Art Unit |
| | BLANE J JACKSON | 2644 |

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|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

**CLAIMS**

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 04/25/2023 | | | | | | | | |
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| | 31 | ✓ | | | | | | | | |
| | 32 | ✓ | | | | | | | | |
| | 33 | ✓ | | | | | | | | |
| | 34 | ✓ | | | | | | | | |
| | 35 | ✓ | | | | | | | | |
| | 36 | ✓ | | | | | | | | |
| | 37 | ✓ | | | | | | | | |
| | 38 | ✓ | | | | | | | | |

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 17/956,889 | Reddy et al. |
| | Examiner | Art Unit |
| | BLANE J JACKSON | 2644 |

| CPC - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| H04B 1/16, 1/0014 | 04/25/2023 | BJJ |
| H04N 5/455, 21/426 | 04/25/2023 | BJJ |

| CPC Combination Sets - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US Classification - Searched* | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Review of IDS & prior parent patents, DP with US 11,490,152 to FAOM | 04/25/2023 | BJJ |

| Interference Search | | | |
|---|---|---|---|
| US Class/CPC Symbol | US Subclass/CPC Group | Date | Examiner |
| | | | |

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | |
| Filing Date | 2022-09-30 |
| First Named Inventor | Madhukar Reddy |
| Art Unit | |
| Examiner Name | |
| Attorney Docket Number | 28427US16 |

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| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | 7130576 | | 2006-10-31 | Gurantz et al. | |
| | 2 | 7542715 | | 2009-06-02 | Gurantz et al. | |

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|---|---|---|
| | Application Number | |
| | Filing Date | 2022-09-30 |
| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T5 |
|---|---|---|---|
| | 1 | Entropic Communications, LLC v. Charter Communications, Inc. Civil Action No. 2:22-cv-00125-JRG, Defendants' Invalidity and Subject-Matter Eligibility Contentions. | |
| | 2 | Entropic Communications, LLC v. DirecTV, LLC and Entropic Communications, LLC v. Dish Network Corp., Civil Action No. 2:22-cv-00075-JRG and Civil Action No. 2:22-cv-00076-JRG, Defendants' P.R. 3-3 Invalidity Contentions. | |
| | 3 | Appendix A - 576 Patent - Additional References and Obviousness Chart. | |
| | 4 | Appendix B - 715 Patent - Additional References and Obviousness Chart. | |
| | 5 | Ex D1 - Invalidity Claim Chart US9210362 - Favrat. | |
| | 6 | Ex D2 - Invalidity Claim Chart US9210362 - Li. | |
| | 7 | Ex D3 - Invalidity Claim Chart US9210362 - McNeely. | |
| | 8 | Ex D4 - Invalidity Claim Chart US9210362 - Zhang. | |
| | 9 | Ex D5 - Invalidity Claim Chart US9210362 - Pugel. | |
| | 10 | Ex. A1 - Invalidity Claim Chart - 576 Patent - Ardemagni. | |



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|---|---|---|
| | Application Number | |
| | Filing Date | 2022-09-30 |
| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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|---|---|---|---|
| | 11 | Ex. A2 - Invalidity Claim Chart - 576 Patent - Basawapatna. | |
| | 12 | Ex. A3 - Invalidity Claim Chart - 576 Patent - Carnero. | |
| | 13 | Ex. A4 - Invalidity Claim Chart - 576 Patent - Davis 055. | |
| | 14 | Ex. A5 - Invalidity Claim Chart - 576 Patent - Davis 730. | |
| | 15 | Ex. A6 - Invalidity Claim Chart - 576 Patent - Gregoire. | |
| | 16 | Ex. A7 - Invalidity Claim Chart - 576 Patent - Inose. | |
| | 17 | Ex. A8 - Invalidity Claim Chart - 576 Patent - James. | |
| | 18 | Ex. A9 - Invalidity Claim Chart - 576 Patent - Kang. | |
| | 19 | Ex. A10 - Invalidity Claim Chart - 576 Patent - Lovinggood. | |
| | 20 | Ex. A11 - Invalidity Claim Chart - 576 Patent - Mutzig. | |
| | 21 | Ex. A12 - Invalidity Claim Chart - 576 Patent - Petruzzelli. | |



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|---|---|---|
| | Application Number | |
| | Filing Date | 2022-09-30 |
| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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|---|---|---|---|
| | 22 | Ex. A13 - Invalidity Claim Chart - 576 Patent - Pugel 200. | |
| | 23 | Ex. A14 - Invalidity Claim Chart - 576 Patent - Williams 419. | |
| | 24 | Ex. A15 - Invalidity Claim Chart - 576 Patent - Williams 873. | |
| | 25 | Ex. B1 - Invalidity Claim Chart - 715 Patent - Ardemagni. | |
| | 26 | Ex. B2 - Invalidity Claim Chart - 715 Patent - Carnero. | |
| | 27 | Ex. B3 - Invalidity Claim Chart - 715 Patent - Davis 055. | |
| | 28 | Ex. B4 - Invalidity Claim Chart - 715 Patent - Davis 730. | |
| | 29 | Ex. B5 - Invalidity Claim Chart - 715 Patent - Fisk. | |
| | 30 | Ex. B6 - Invalidity Claim Chart - 715 Patent - Gregoire. | |
| | 31 | Ex. B7 - Invalidity Claim Chart - 715 Patent - Hicks. | |
| | 32 | Ex. B8 - Invalidity Claim Chart - 715 Patent - Kang. | |



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| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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|---|---|---|---|
| | 33 | Ex. B9 - Invalidity Claim Chart - 715 Patent - Mutzig. | |
| | 34 | Ex. B10 - Invalidity Claim Chart - 715 Patent - Oishi. | |
| | 35 | Ex. B11 - Invalidity Claim Chart - 715 Patent - Petruzzelli. | |
| | 36 | Ex. B12 - Invalidity Claim Chart - 715 Patent - Williams 419. | |
| | 37 | Ex. B13 - Invalidity Claim Chart - 715 Patent - Williams 873. | |
| | 38 | Entropic Communications, LLC v. DirecTV, LLC and Entropic Communications, LLC v. Dish Network Corp., Civil Action No. 2:22-cv-00075-JRG and Civil Action No. 2:22-cv-00076-JRG, Defendants' P.R. 3-3 Invalidity Contentions. | |

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**EXAMINER SIGNATURE**

| Examiner Signature | /BLANE J JACKSON/ | Date Considered | 04/25/2023 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.



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| INFORMATION DISCLOSURE STATEMENT BY APPLICANT ( Not for submission under 37 CFR 1.99) | | |
|---|---|---|
| | Application Number | |
| | Filing Date | 2022-09-30 |
| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

| Signature | /Wayne H. Bradley/ | Date (YYYY-MM-DD) | 2022-11-17 |
|---|---|---|---|
| Name/Print | Wayne H. Bradley | Registration Number | 39916 |

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | British Equivalents | Time Stamp |
|---|---|---|---|---|---|---|---|
| L1 | 2 | "11490152".pn. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 11:20 AM |
| L2 | 2 | "11399206".pn. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 11:32 AM |
| L3 | 2 | "10972781".pn. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 11:34 AM |
| L4 | 8 | "10313733".pn. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, | OR | ON | ON | 2023/04/25 11:35 AM |

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| | | | CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | | | | |
| L5 | 5 | "9819992".pn. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 11:37 AM |
| L6 | 8 | "9210363".pn. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 11:39 AM |
| L7 | 22 | "9100622".pn. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, | OR | ON | ON | 2023/04/25 11:40 AM |

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|---|---|---|---|---|---|---|---|
| | | | VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | | | | |
| L8 | 3 | "8526898".pn. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 11:41 AM |
| L9 | 56 | ("10313733" OR "10972781" OR "11381866" OR "20030158614" OR "20030228855" OR "20040058661" OR "20040110522" OR "20050040909" OR "20050286562" OR "20070002961" OR "20070032220" OR "20070042742" OR "20070111661" OR "20070179649" OR "20070263754" OR "20090075613" OR "20090258629" OR "20110105068" OR "5280636" OR "5590156" OR "5705949" OR "5768268" OR "6253094" OR "6262981" OR "6282184" OR "6735421" OR "6760342" OR "6906498" OR "6920185" OR "6992855" OR "7095454" OR "7145972" OR "7167694" OR "7362178" OR "7373125" OR "7421259" OR "7599673" OR "8107916" OR | (US-PGPUB; USPAT) | OR | ON | ON | 2023/04/25 11:44 AM |

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|---|---|---|---|---|---|---|---|
| | | "8285240" OR "8300681" OR "8331886" OR "8374568" OR "8374569" OR "8374570" OR "8526898" OR "8577319" OR "8666350" OR "8892225" OR "8909187" OR "9059672" OR "9100622" OR "9210362" OR "9210363" OR "9225373" OR "9819992" OR "9942598").pn. | | | | | |
| L11 | 103 | Reddy-Madhukar.in. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 12:20 PM |
| L12 | 46 | Reddy-Madhukar.in. AND DFE | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 12:21 PM |
| L14 | 81 | Ling-Curtis.in. AND DFE | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, | OR | ON | ON | 2023/04/25 12:22 PM |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | | | | |
| L15 | 27 | Gallagher-Tim.in. AND DFE | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/04/25 12:23 PM |
| L16 | 2 | ("7130576" OR "7542715").pn. | (US-PGPUB; USPAT) | OR | ON | ON | 2023/04/25 12:25 PM |

## PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

# Bibliographic Data

Application No: 17/956,889

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /BLANE J JACKSON/ (Examiner's Signature) | (Initials)

Title: SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL

| FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|
| 09/30/2022 | 348 | 2644 | 28427US16 |
| RULE | | | |

**APPLICANTS**

Entropic Communications, LLC,

**INVENTORS**

Madhukar Reddy, Carlsbad, CA, UNITED STATES

Curtis Ling, Carlsbad, CA, UNITED STATES

Tim Gallagher, Carlsbad, CA, UNITED STATES

**CONTINUING DATA**

This application is a CON of 17862946 07/12/2022 PAT 11490152

17862946 is a CON of 17587462 01/28/2022 PAT 11399206

17587462 is a CON of 17217244 03/30/2021ABN

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14948881 is a CON of 14617973 02/10/2015 PAT 9210363

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13962871 is a CON of 12762900 04/19/2010 PAT 8526898

12762900 has PRO of 61170526 04/17/2009

**FOREIGN APPLICATIONS**

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10/13/2022

**STATE OR COUNTRY**

UNITED STATES

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SUITE 3400
CHICAGO, IL 60661
UNITED STATES

**FILING FEE RECEIVED**

$1,980

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
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**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**
**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | |
| Filing Date | 2022-09-30 |
| First Named Inventor | Madhukar Reddy |
| Art Unit | |
| Examiner Name | |
| Attorney Docket Number | 28427US16 |

**U.S.PATENTS** Remove

| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
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|---|---|---|
| | Application Number | |
| | Filing Date | 2022-09-30 |
| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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| | 9 | 8374568 | | 2013-02-12 | Seendripu et al. | |
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| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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| | 31 | 6282184 | | 2001-08-28 | Lehman et al. | |
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| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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| | 42 | 11381866 | | 2022-07-05 | Reddy et al. | |

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.J.J/

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| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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| | 1 | 2087623 | EP | A2 | 2009-08-12 | RF Magic Inc. | | |

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| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

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|---|---|---|---|
| | 1 | JEFFREY A. WELDON, et al. "A 1.75-GHz Highly Integrated Narrow-Band CMOS Transmitter With Harmonic-Rejection Mixers, IEEE Journal of Solid-State Circuits, December 2001, pages: 2003-2015, Vol. 36, No. 12, Seattle, Washington. | |
| | 2 | Int'l Search Report and Written Opinion Appln No. PCT/2010/031631 mailed June 17, 2010. | |
| | 3 | Int'l Search Report and Written Opinion Appln No. PCT/2010/031627 mailed June 18, 2010. | |

If you wish to add additional non-patent literature document citation information please click the Add button Add

**EXAMINER SIGNATURE**

| Examiner Signature | /BLANE J JACKSON/ | Date Considered | 04/25/2023 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.



ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /B.J.J/

| INFORMATION DISCLOSURE STATEMENT BY APPLICANT ( Not for submission under 37 CFR 1.99) | | |
|---|---|---|
| | Application Number | |
| | Filing Date | 2022-09-30 |
| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

| Signature | /Wayne H. Bradley/ | Date (YYYY-MM-DD) | 2022-09-30 |
|---|---|---|---|
| Name/Print | Wayne H. Bradley | Registration Number | 39916 |

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



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## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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TO: mhmpto@mcandrews-ip.com
FROM: noreply@uspto.gov
CC: PatentCenter_eOfficeAction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 23446

Mon May 01 07:07:34 EDT 2023

Dear Patent Center Customer:

Correspondence Address:

MCANDREWS HELD &MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO,ILLINOIS,60661
UNITED STATES

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| Application | Document | Mailroom Date | Attorney Docket No. |
|---|---|---|---|
| 17956889 | CTNF | 05/01/2023 | 28427US16 |
| 17956889 | 1449 | 05/01/2023 | 28427US16 |
| 17956889 | 1449 | 05/01/2023 | 28427US16 |

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Sincerely,

The Patent Center Team

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**
Attorney Docket No. 28427US16

| | |
|---|---|
| Patent Application of:<br><br>Madhukar Reddy<br><br>Application No. 17/956,889<br><br>Filed: September 30, 2022<br><br>Title: SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL<br><br>Examiner: JACKSON, BLANE J.<br><br>Group Art Unit: 2644<br><br>Confirmation No.: 8470 | **EFS ELECTRONIC FILING**<br><br>**July 25, 2023** |

## Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This paper responds to the Office Action of May 1, 2023 ("OA"). This response is timely filed. The Applicant respectfully requests reconsideration in view of the following remarks.

Amendments to the Claims begin on page 2.

Remarks begin on page 5.

## LISTING OF CLAIMS

1-18 (Cancelled)

19. (Previously Presented) A method for operating a television receiver, comprising:
receiving, by an input terminal, an input signal comprising broadcast channels, the broadcast channels comprising a plurality of desired channels and a plurality of undesired channels, wherein the plurality of desired channels are non-contiguous;
processing, by a radio front end coupled to the input terminal, the input signal to generate a processed input signal;
digitizing, by an analog-to-digital converter (ADC) coupled to the radio front end, the processed input signal to generate a digitized signal;
selecting, by a digital frontend (DFE) coupled to the ADC, the plurality of desired channels from the digitized signal; and
outputting, by the DFE, the selected plurality of desired channels to at least one demodulator as a digital datastream, wherein the demodulator extracts information encoded in the digital datastream.

20. (Previously Presented) The method of claim 19, wherein the DFE outputs the digital datastream via a serial interface.

21. (Previously Presented) The method of claim 19, wherein the DFE outputs the digital datastream via a parallel interface.

22. (Previously Presented) The method of claim 19, wherein the ADC comprises:
a first ADC configured to generate a digital in-phase signal; and
a second ADC configured to generate a digital quadrature signal.

23. (Previously Presented) The method of claim 19, wherein the extracted information is stored for use in a digital video recorder (DVR).

24. (Previously Presented) The method of claim 19, wherein the extracted information is output for a picture-in-picture display.

25. (Previously Presented) The method of claim 19, wherein the plurality of desired channels comprises at least one television channel.

26. (Previously Presented) The method of claim 19, wherein the plurality of undesired channels comprises at least one television channel.

27. (Previously Presented) The method of claim 19, wherein the broadcast channels comprise satellite broadcast channels.

28. (Previously Presented) The method of claim 19, wherein the broadcast channels comprise cable broadcast channels.

29. (Previously Presented) A television receiver device, comprising:

an input terminal operable to receive an input signal comprising broadcast channels, the broadcast channels comprising a plurality of desired channels and a plurality of undesired channels, wherein the plurality of desired channels are non-contiguous;

a radio front end, coupled to the input terminal, operable to process the input signal;

an analog-to-digital converter (ADC), coupled to the radio front end, operable to digitize the processed input signal to generate a digitized signal; and

a digital frontend (DFE), coupled to the ADC, operable to select the plurality of desired channels from the digitized signal and output the selected plurality of desired channels to at least one demodulator as a digital datastream, wherein the demodulator is operable to extract information encoded in the digital datastream.

30. (Previously Presented) The television receiver device of claim 29, wherein the DFE is operable to output the digital datastream via a serial interface.

31. (Previously Presented) The television receiver device of claim 29, wherein the DFE is operable to output the digital datastream via a parallel interface.

32. (Previously Presented) The television receiver device of claim 29, wherein the ADC comprises:

a first ADC configured to generate a digital in-phase signal; and
a second ADC configured to generate a digital quadrature signal.

33. (Previously Presented) The television receiver device of claim 29, wherein the extracted information is stored for use in a digital video recorder (DVR).

34. (Previously Presented) The television receiver device of claim 29, wherein the extracted information is output for a picture-in-picture display.

35. (Previously Presented) The television receiver device of claim 29, wherein the plurality of desired channels comprises at least one television channel.

36. (Previously Presented) The television receiver device of claim 29, wherein the plurality of undesired channels comprises at least one television channel.

37. (Previously Presented) The television receiver device of claim 29, wherein the broadcast channels comprise satellite broadcast channels.

38. (Previously Presented) The television receiver device of claim 29, wherein the broadcast channels comprise cable broadcast channels.

## REMARKS

The present application includes pending claims 19-38. Claims 19-38 have been rejected. The Office Action of May 1, 2023 ("OA") has been carefully considered.

Allowance of the claims in view of the following remarks are respectfully requested.

## Double Patenting

Present claims 19-38 are rejected on the ground of nonstatutory obviousness-type double patenting as being allegedly unpatentable over claims 1-20 of U.S. Patent No. 11,490,152.

The Applicant respectfully traverses the above rejection, but in order to advance prosecution a terminal disclaimer is filed herewith. The terminal disclaimer obviates and therefore overcomes the nonstatutory obviousness-type double patenting rejection.

## Final Matters

The Office Action makes various statements, including without limitation statements regarding the claims, the cited references, one of ordinary skill in the art, etc., that are now moot in view of the previously presented amendments and/or arguments. Thus, the Applicant will not address all of such statements at the present time. However, the Applicant expressly reserves the right to challenge such statements in the future should the need arise (*e.g.*, if such statements should become relevant by reappearing in a rejection of any current or future claim or be relied upon in any proceeding involving this application or a corresponding patent). The Applicant also respectfully reserves the right to argue additional reasons that support the allowability of all claims, whether or not argued in this Response or previous responses, should that need arise in the future.

**Conclusion**

The Applicant submits that the pending claims are in condition for allowance and courteously solicits an expeditious Notice of Allowability with respect to all pending claims. If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited to contact the undersigned attorney.

The Commissioner is authorized to charge any necessary fees, or credit any overpayment to the Deposit Account of McAndrews, Held & Malloy, Account No. 13-0017.

Respectfully submitted,

Dated: July 25, 2023

/Wayne H. Bradley/
Wayne H. Bradley
Reg. No. 39,916

McAndrews, Held & Malloy, Ltd.
500 W. Madison Street
34th Floor
Chicago, Il 60661
Phone (312) 775-8000
Fax (312) 775-8100

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 48344476 |
| **Application Number:** | 17956889 |
| **International Application Number:** | |
| **Confirmation Number:** | 8470 |
| **Title of Invention:** | SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL |
| **First Named Inventor/Applicant Name:** | Madhukar Reddy |
| **Customer Number:** | 23446 |
| **Filer:** | Wayne Bradley/Laura Foley |
| **Filer Authorized By:** | Wayne Bradley |
| **Attorney Docket Number:** | 28427US16 |
| **Receipt Date:** | 25-JUL-2023 |
| **Filing Date:** | 30-SEP-2022 |
| **Time Stamp:** | 12:32:37 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 28427US16_FINAL_Response.pdf | 35764<br>67fe5cdd30c8103a622f1f406bea86a9a6b29d2a | yes | 6 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Amendment/Request for Reconsideration-After Non-Final Rejection | 1 | 1 |
| | Claims | 2 | 4 |
| | Applicant Arguments/Remarks Made in an Amendment | 5 | 6 |
| **Warnings:** | | | |
| **Information:** | | | |
| | **Total Files Size (in bytes):** | 35764 | |

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**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**
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| | |
|---|---|
| **Doc Code: DIST.E.FILE**<br>**Document Description: Electronic Terminal Disclaimer - Filed** | PTO/SB/26<br>U.S. Patent and Trademark Office<br>Department of Commerce |

| | |
|---|---|
| Electronic Petition Request | **TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT** |
| Application Number | 17956889 |
| Filing Date | 30-Sep-2022 |
| First Named Inventor | Madhukar Reddy |
| Attorney Docket Number | 28427US16 |
| Title of Invention | SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL |

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

| Owner | Percent Interest |
|---|---|
| Entropic Communications, LLC | 100% |

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

11490152

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

| | |
|---|---|
| ○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application. | |
| Applicant claims the following fee status:<br><br>○ Small Entity<br><br>○ Micro Entity<br><br>◉ Regular Undiscounted<br><br>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon. | |
| THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES<br><br>I certify, in accordance with 37 CFR 1.4(d)(4) that I am:<br><br>◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application<br><br>Registration Number 39916<br><br>○ A sole inventor<br><br>○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application<br><br>○ A joint inventor; all of whom are signing this request | |
| Signature | /Wayne H. Bradley/ |
| Name | Wayne H. Bradley |

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 17956889 |
| **Filing Date:** | 30-Sep-2022 |
| **Title of Invention:** | SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL |
| **First Named Inventor/Applicant Name:** | Madhukar Reddy |
| **Filer:** | Wayne Bradley/Laura Foley |
| **Attorney Docket Number:** | 28427US16 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| STATUTORY OR TERMINAL DISCLAIMER | 1814 | 1 | 170 | 170 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | | **Total in USD ($)** | **170** |

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 17956889

Filing Date: 30-Sep-2022

Applicant/Patent under Reexamination: Reddy

Electronic Terminal Disclaimer filed on July 25, 2023

☒ APPROVED

**This patent is subject to a terminal disclaimer**

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

| Electronic Acknowledgement Receipt | |
|---|---|
| **EFS ID:** | 48344494 |
| **Application Number:** | 17956889 |
| **International Application Number:** | |
| **Confirmation Number:** | 8470 |
| **Title of Invention:** | SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL |
| **First Named Inventor/Applicant Name:** | Madhukar Reddy |
| **Customer Number:** | 23446 |
| **Filer:** | Wayne Bradley/Laura Foley |
| **Filer Authorized By:** | Wayne Bradley |
| **Attorney Docket Number:** | 28427US16 |
| **Receipt Date:** | 25-JUL-2023 |
| **Filing Date:** | 30-SEP-2022 |
| **Time Stamp:** | 12:35:48 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | CARD |
| Payment was successfully received in RAM | $170 |
| RAM confirmation Number | E20237OC35469988 |
| Deposit Account | 130017 |
| Authorized User | Laura Foley |
| The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:<br>37 CFR 1.16 (National application filing, search, and examination fees)<br>37 CFR 1.17 (Patent application and reexamination processing fees) | |

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Terminal Disclaimer-Filed (Electronic) | eTerminal-Disclaimer.pdf | 41305<br>1951dba6df36c6e0ed040f9620101cd8e7a4fa65 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 38007<br>cade3d15959ba212163722f48f6b1aa8693e9f3c | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 79312 | | |

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**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**
**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**
**New International Application Filed with the USPTO as a Receiving Office**
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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>17/956,889 | Filing Date<br>09/30/2022 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY:** ☑ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED - PART I

| FOR | (Column 1)<br>NUMBER FILED | (Column 2)<br>NUMBER EXTRA | | RATE ($) | FEE ($) |
|---|---|---|---|---|---|
| ☐ BASIC FEE<br>(37 CFR 1.16(a), (b), or (c)) | N/A | N/A | | N/A | |
| ☐ SEARCH FEE<br>(37 CFR 1.16(k), (i), or (m)) | N/A | N/A | | N/A | |
| ☐ EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q)) | N/A | N/A | | N/A | |
| TOTAL CLAIMS<br>(37 CFR 1.16(i)) | minus 20 = | * | | x $100 = | |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h)) | minus 3 = | * | | x $480 = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | | TOTAL | |

## APPLICATION AS AMENDED - PART II

| | | (Column 1) | | (Column 2) | (Column 3) | | | |
|---|---|---|---|---|---|---|---|---|
| AMENDMENT | 07/25/2023 | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | | RATE ($) | ADDITIONAL FEE ($) |
| | Total<br>(37 CFR 1.16(i)) | * 20 | Minus | ** 20 | = 0 | | x $100 = | 0 |
| | Independent<br>(37 CFR 1.16(h)) | * 2 | Minus | *** 3 | = 0 | | x $480 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | |
| | | | | | | | TOTAL ADD'L FEE | 0 |

| | | (Column 1) | | (Column 2) | (Column 3) | | | |
|---|---|---|---|---|---|---|---|---|
| AMENDMENT | | CLAIMS REMAINING AFTER AMENDMENT | | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | | RATE ($) | ADDITIONAL FEE ($) |
| | Total<br>(37 CFR 1.16(i)) | * | Minus | ** | = | | x $0 = | |
| | Independent<br>(37 CFR 1.16(h)) | * | Minus | *** | = | | x $0 = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | |
| | | | | | | | TOTAL ADD'L FEE | |

| | |
|---|---|
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3. | LIE |
| ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". | /ANTJUAN M RIVERA/ |
| *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". | |
| The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. | |

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

# NOTICE OF ALLOWANCE AND FEE(S) DUE

23446 7590 08/14/2023

MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

| EXAMINER |
|---|
| JACKSON, BLANE J |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

DATE MAILED: 08/14/2023

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 17/956,889 | 09/30/2022 | Madhukar Reddy | 28427US16 | 8470 |

TITLE OF INVENTION: SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | UNDISCOUNTED | $1200 | $0.00 | $0.00 | $1200 | 11/14/2023 |

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

**HOW TO REPLY TO THIS NOTICE:**

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.**

## PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23446 7590 08/14/2023
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

| (Typed or printed name) |
|---|
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 17/956,889 | 09/30/2022 | Madhukar Reddy | 28427US16 | 8470 |

TITLE OF INVENTION: SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | UNDISCOUNTED | $1200 | $0.00 | $0.00 | $1200 | 11/14/2023 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---|---|---|
| JACKSON, BLANE J | 2644 | 348-731000 |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via Patent Center or EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 17/956,889 | 09/30/2022 | Madhukar Reddy | 28427US16 | 8470 |

23446 7590 08/14/2023

MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

| EXAMINER | |
|---|---|
| JACKSON, BLANE J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2644 | |

DATE MAILED: 08/14/2023

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

## Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

| Notice of Allowability | Application No. 17/956,889 | Applicant(s) Reddy et al. | |
|---|---|---|---|
| | Examiner BLANE J JACKSON | Art Unit 2644 | AIA (FITF) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--*

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 25 July 2023.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 19-38 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   **Certified copies:**

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/BLANE J JACKSON/
Primary Examiner, Art Unit 2644

## DETAILED ACTION

### *Notice of Pre-AIA or AIA Status*

The present application is being examined under the pre-AIA first to invent provisions.

### *Terminal Disclaimer*

The terminal disclaimer filed on 25 July 2023 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US 11,490,352 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### *Allowable Subject Matter*

Claims 19-38 are allowed. The following is a statement of reasons for the indication of allowable subject matter: the prior art made of record teach a receiver for a wireless telecommunication system teach all of the adjacent frequency bands in the IF signal passed by a band pass filter in the radio frontend are converted to a digital signal by an ADC and then separated into their respective frequency bands by a channelizer where the separated frequency bands are processed in the normal manner by subsequent DSP devices, see Claxton et al. US 6,735,421. The prior art made of record do not teach selecting, by a digital frontend (DFE) coupled to the ADC, a plurality of desired channels from the digitized signal and outputting by the DFE, the selected plurality of desired channels to at least one demodulator as a digital datastream.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BLANE J JACKSON whose telephone number is (571)272-7890. The examiner can normally be reached 7:30-4:30 M-TH; 8-2 FRI.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathy Wang-Hurst can be reached on 571 270 5371. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BLANE J JACKSON/
Primary Examiner, Art Unit 2644

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 17/956,889 | Reddy et al. |
| | Examiner | Art Unit |
| | BLANE J JACKSON | 2644 |

| CPC - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| H04B 1/001, 1/16, 1/0014 | 04/25/2023 | BJJ |
| H04N 5/455, 21/41, 21/426, 21/4263 | 04/25/2023 | BJJ |

| CPC Combination Sets - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US Classification - Searched* | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Review of IDS & prior parent patents, DP with US 11,490,152 to FAOM | 04/25/2023 | BJJ |
| Review of TD, update SEARCH to issue | 07/31/2023 | BJJ |

| Interference Search | | | |
|---|---|---|---|
| US Class/CPC Symbol | US Subclass/CPC Group | Date | Examiner |
| | no interference listed symbol/ group | 07/31/2023 | BJJ |

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 17/956,889 | Reddy et al. |
| | **Examiner** | **Art Unit** |
| | BLANE J JACKSON | 2644 |

| CPC | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | | | | | **Type** | **Version** |
| H04N | / | 21 | / | 4263 | F | 2013-01-01 |
| H04B | / | 1 | / | 0014 | I | 2013-01-01 |
| H04N | / | 5 | / | 50 | I | 2013-01-01 |
| H04N | / | 21 | / | 4383 | I | 2013-01-01 |
| H04N | / | 21 | / | 454 | I | 2013-01-01 |
| H04N | / | 21 | / | 6193 | I | 2013-01-01 |
| H04N | / | 21 | / | 6143 | I | 2013-01-01 |
| H04N | / | 5 | / | 455 | I | 2013-01-01 |
| H04N | / | 21 | / | 4382 | I | 2013-01-01 |

| CPC Combination Sets | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Symbol** | | | | | **Type** | **Set** | **Ranking** | **Version** |
| | / | | / | | | | | |

| NONE | | Total Claims Allowed: | |
|---|---|---|---|
| (Assistant Examiner) | (Date) | 20 | |
| /Blane J Jackson/ | 31 July 2023 | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | (Date) | 19 | 2 |

U.S. Patent and Trademark Office — Part of Paper No.: 20230731

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 17/956,889 | Reddy et al. |
| | **Examiner** | **Art Unit** |
| | BLANE J JACKSON | 2644 |

| INTERNATIONAL CLASSIFICATION | | | | |
|---|---|---|---|---|
| **CLAIMED** | | | | |
| H04B | / | 1 | / | 16 |
| H04N | / | 21 | / | 426 |

| NON-CLAIMED | | | | |
|---|---|---|---|---|
| | / | | / | |

| US ORIGINAL CLASSIFICATION | |
|---|---|
| **CLASS** | **SUBCLASS** |
| | |

| CROSS REFERENCES(S) | | | | | | |
|---|---|---|---|---|---|---|
| **CLASS** | **SUBCLASS (ONE SUBCLASS PER BLOCK)** | | | | | |
| | | | | | | |

| NONE | | **Total Claims Allowed:** | |
|---|---|---|---|
| (Assistant Examiner) | (Date) | 20 | |
| /Blane J Jackson/ | 31 July 2023 | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | (Date) | 19 | 2 |

U.S. Patent and Trademark Office — Part of Paper No.: 20230731

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 17/956,889 | Reddy et al. |
| | **Examiner** | **Art Unit** |
| | BLANE J JACKSON | 2644 |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

**CLAIMS**

| Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 10 | 1 | 19 | 10 | 28 | 19 | 37 | | | | | | |
| | 2 | | 11 | 2 | 20 | 11 | 29 | 20 | 38 | | | | | | |
| | 3 | | 12 | 3 | 21 | 12 | 30 | | | | | | | | |
| | 4 | | 13 | 4 | 22 | 13 | 31 | | | | | | | | |
| | 5 | | 14 | 5 | 23 | 14 | 32 | | | | | | | | |
| | 6 | | 15 | 6 | 24 | 15 | 33 | | | | | | | | |
| | 7 | | 16 | 7 | 25 | 16 | 34 | | | | | | | | |
| | 8 | | 17 | 8 | 26 | 17 | 35 | | | | | | | | |
| | 9 | | 18 | 9 | 27 | 18 | 36 | | | | | | | | |

| | | | |
|---|---|---|---|
| NONE | | **Total Claims Allowed:** | |
| (Assistant Examiner) | (Date) | 20 | |
| /Blane J Jackson/ | 31 July 2023 | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | (Date) | 19 | 2 |

U.S. Patent and Trademark Office — Part of Paper No.: 20230731

## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | British Equivalents | Time Stamp |
|---|---|---|---|---|---|---|---|
| L1 | 16 | ("10439746" OR "11139902" OR "7130576" OR "7477871" OR "7542715" OR "7783958" OR "7941091" OR "8023912" OR "8086170" OR "8238813" OR "8566678" OR "8611809" OR "8892026" OR "9219557" OR "9413476" OR "9853757").pn. | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/20 09:32 AM |
| L2 | 73 | Reddy-Madhukar.in. | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/20 11:12 AM |
| L3 | 610 | (H04N OR H04B) AND cable adj6 TV SAME set adj5 top AND band adj5 frequenc$4 SAME (band OR channel adj6 stack$4) | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/20 12:37 PM |
| L4 | 9831956 | (H04N OR H04B) AND cable adj6 TV SAME set adj5 top AND band adj5 frequenc$4 SAME (band OR channel adj6 stack$4) some (mixer OR down adj4 conversion) SAME ((desire OR undesired) adj5 channel) | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/20 12:39 PM |
| L5 | 0 | (H04N OR H04B) AND cable adj6 TV SAME set adj5 top AND band adj5 frequenc$4 SAME (band OR channel adj6 stack$4) SAME (mixer OR down adj4 conversion) SAME ((desire OR undesired) adj5 channel) | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/20 12:39 PM |
| L6 | 31 | (H04N OR H04B) AND cable adj6 TV SAME set adj5 top AND band adj5 frequenc$4 SAME (band OR channel adj6 stack$4) SAME ((desired OR undesired) | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/20 12:40 PM |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | adj5 channel) | | | | | |
| L7 | 210 | (H04N OR H04B) AND (television OR TV) SAME set adj5 top AND band adj5 frequenc$4 SAME (band OR channel adj6 (stack$4 OR contiguous$4)) SAME (desired OR undesired) adj5 channel | (US-PGPUB; USPAT) | OR | ON | ON | 2022/05/20 12:45 PM |
| L8 | 0 | (H01Q OR H04B) AND (very adj5 low adj5 frequency OR VLF) SAME (ocean OR maritime OR body adj4 water) adj6 platform SAME (transmitter OR relay) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/05/24 09:26 AM |
| L9 | 98 | Reddy-Madhukar.in. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/10/19 02:04 PM |
| L10 | 928 | Ling-Curtis.in. | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; | OR | ON | ON | 2022/10/19 02:05 PM |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | IBM_TDB) | | | | |
| L11 | 74 | Ling-Curtis.in. AND DFE | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/10/19 02:05 PM |
| L12 | 22 | Gallagher-Tim.in. AND DFE | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/10/19 02:06 PM |
| L24 | 46 | Reddy-Madhukar.in. AND DFE | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/07/31 03:43 PM |

## PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

TO: mhmpto@mcandrews-ip.com
FROM: noreply@uspto.gov
CC: patentcenter_eofficeaction@uspto.gov
SUBJECT: USPTO: Patent Electronic System - Correspondence Notification for Customer Number 23446

Mon Aug 14 05:42:07 EDT 2023

Dear Patent Center Customer:

Correspondence Address:

MCANDREWS HELD &MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO,ILLINOIS,60661
UNITED STATES

This is a courtesy notification regarding the following USPTO patent application(s) associated with your Customer Number, 23446, that have new outgoing correspondence. This correspondence is now available for viewing in Patent Center.

The official date of notification of the outgoing correspondence will be indicated on the form (e.g., PTOL-90) accompanying the correspondence.

Disclaimer:
The list of documents shown below are provided as a courtesy and is not part of the official file wrapper. The content of the images shown in the Image File Wrapper is the official record.

| Application | Document | Mailroom Date | Attorney Docket No. |
|---|---|---|---|
| 17956889 | NOA | 08/14/2023 | 28427US16 |

To view your correspondence online, please sign in to Patent Center and then select Workbench/View correspondence. To update your email address(es), select Manage/Manage customer numbers.

If you have any questions, please contact the Patent Electronic Business Center (EBC) at ebc@uspto.gov or 866-217-9197 Monday – Friday, 6 a.m. to midnight ET.

Please do not reply to this email as it was sent from an unmonitored mailbox.

Sincerely,

The Patent Center Team

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

# REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
## (Submitted Only via EFS-Web)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Application Number | 17/956,889 | Filing Date | 2022-09-30 | Docket Number (if applicable) | 28427US16 | Art Unit | 2644 |
| First Named Inventor | Madhukar Reddy | | | Examiner Name | JACKSON, BLANE J. | | |

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.**
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

### SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☐ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

### MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

### FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 130017

### SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

| Signature of Registered U.S. Patent Practitioner | | | |
|---|---|---|---|
| Signature | /Wayne H. Bradley/ | Date (YYYY-MM-DD) | 2023-08-16 |
| Name | Wayne H. Bradley | Registration Number | 39916 |

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

# Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-22)
Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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**INFORMATION DISCLOSURE STATEMENT BY APPLICANT**
**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | 17956889 |
| Filing Date | 2022-09-30 |
| First Named Inventor | Madhukar Reddy |
| Art Unit | |
| Examiner Name | |
| Attorney Docket Number | 28427US16 |

**U.S.PATENTS** Remove

| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | 6704372 | | 2004-03-09 | Zhang et al. | |
| | 2 | 7265792 | | 2007-09-04 | Favrat et al. | |
| | 3 | 7522901 | | 2009-04-21 | Dauphinee | |

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| Examiner Initial* | Cite No | Publication Number | Kind Code[1] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | 20070098089 | | 2007-05-03 | Li et al. | |

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| Examiner Initial* | Cite No | Foreign Document Number[3] | Country Code[2] i | Kind Code[4] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear | T[5] |
|---|---|---|---|---|---|---|---|---|
| | 1 | | | | | | | |

| INFORMATION DISCLOSURE STATEMENT BY APPLICANT ( Not for submission under 37 CFR 1.99) | | |
|---|---|---|
| | Application Number | 17956889 |
| | Filing Date | 2022-09-30 |
| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

| If you wish to add additional Foreign Patent Document citation information please click the Add button | | | Add |
|---|---|---|---|
| **NON-PATENT LITERATURE DOCUMENTS** | | | Remove |
| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T[5] |
| | 1 | | |
| If you wish to add additional non-patent literature document citation information please click the Add button | | | Add |

**EXAMINER SIGNATURE**

| Examiner Signature | | Date Considered | |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

| INFORMATION DISCLOSURE STATEMENT BY APPLICANT ( Not for submission under 37 CFR 1.99) | | |
|---|---|---|
| | Application Number | 17956889 |
| | Filing Date | 2022-09-30 |
| | First Named Inventor | Madhukar Reddy |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 28427US16 |

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

| Signature | /Wayne H. Bradley/ | Date (YYYY-MM-DD) | 2023-08-16 |
|---|---|---|---|
| Name/Print | Wayne H. Bradley | Registration Number | 39916 |

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 17956889 |
| **Filing Date:** | 30-Sep-2022 |
| **Title of Invention:** | SYSTEM AND METHOD FOR RECEIVING A TELEVISION SIGNAL |
| **First Named Inventor/Applicant Name:** | Madhukar Reddy |
| **Filer:** | Wayne Bradley/Laura Foley |
| **Attorney Docket Number:** | 28427US16 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
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| **First Named Inventor/Applicant Name:** | Madhukar Reddy |
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| Authorized User | Laura Foley |
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## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Request for Continued Examination (RCE) | 28427US16_RCE_sb30.pdf | 1667144<br>2031a12dd03bcb33bbcbf3251eae122b480e274b | no | 3 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Information Disclosure Statement (IDS) Form (SB08) | 28427US16_IDS_sb08a_EFS-WEB.pdf | 1235784<br>74d306878129b300160b269d9c8df23c4e2fcdf7 | no | 4 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Fee Worksheet (SB06) | fee-info.pdf | 38135<br>fe7f4becc370da02d538b2c386919e1c15cb1c32 | no | 2 |
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**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**
**<u>National Stage of an International Application under 35 U.S.C. 371</u>**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**
**<u>New International Application Filed with the USPTO as a Receiving Office</u>**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

'008 AND '826 PATENTS: SPECTRUM MONITORING

## Monitoring Module

The monitoring module **154** may be operable to analyze the band $C_{x,1}$ that it receives from the channelizer **102** to measure/determine characteristics such as, for example, signal power level vs. frequency, delay vs. frequency, phase shift vs. frequency, type and/or amount of modulation, code rate, interference levels, signal to noise ratio, a transfer function of the channel of over which the signal was received, an impulse response of the channel over which the signal was received, and/or any other characteristic that may help assess characteristics of the channel over which the signal was received, assess characteristics of the transmitter that sent the signal and/or any otherwise be pertinent to performance of the communication system. The monitoring module may also be

'008 Patent, 3:33-45

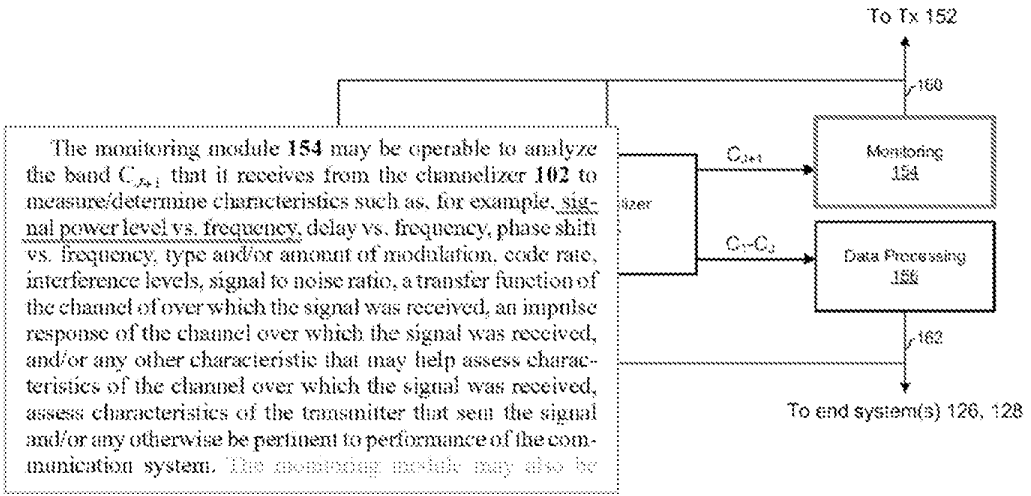


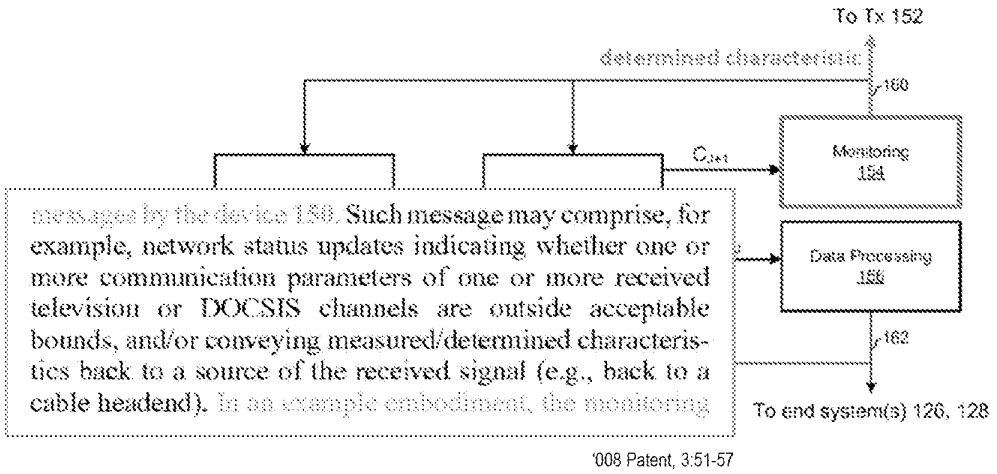

FIG. 1B

36

As the specification explains, one example of a characteristic that the monitoring module can determine is signal power level versus frequency.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## Monitoring Module

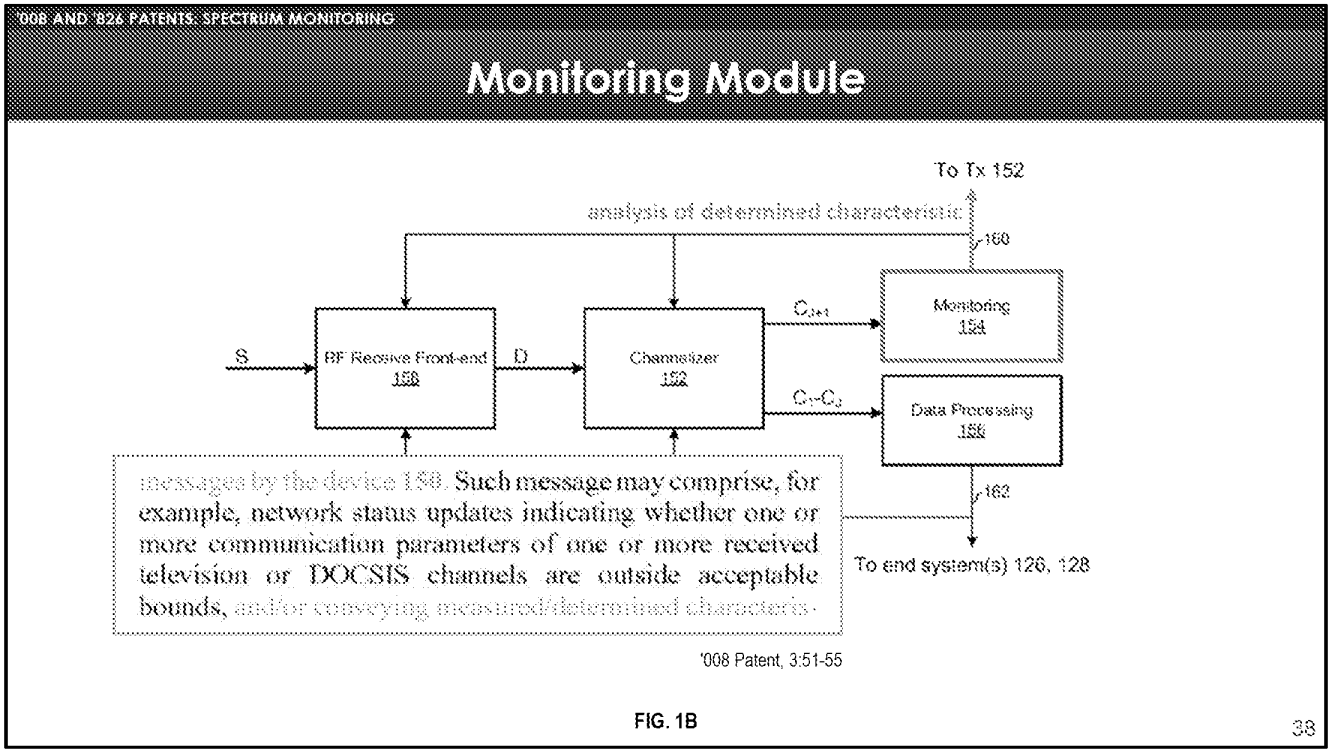



'008 Patent, 3:51-57

FIG. 1B

37

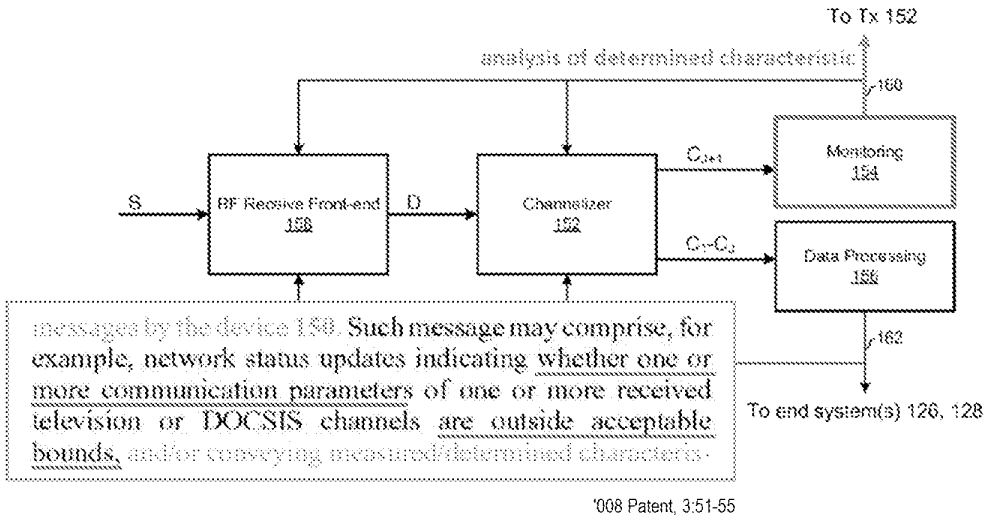
After the monitoring module determines a characteristic of the frequency band, it can send that determined characteristic back to the headend.




Alternatively, the monitoring module can analyze the determined characteristic and send that analysis back to the headend.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## Monitoring Module

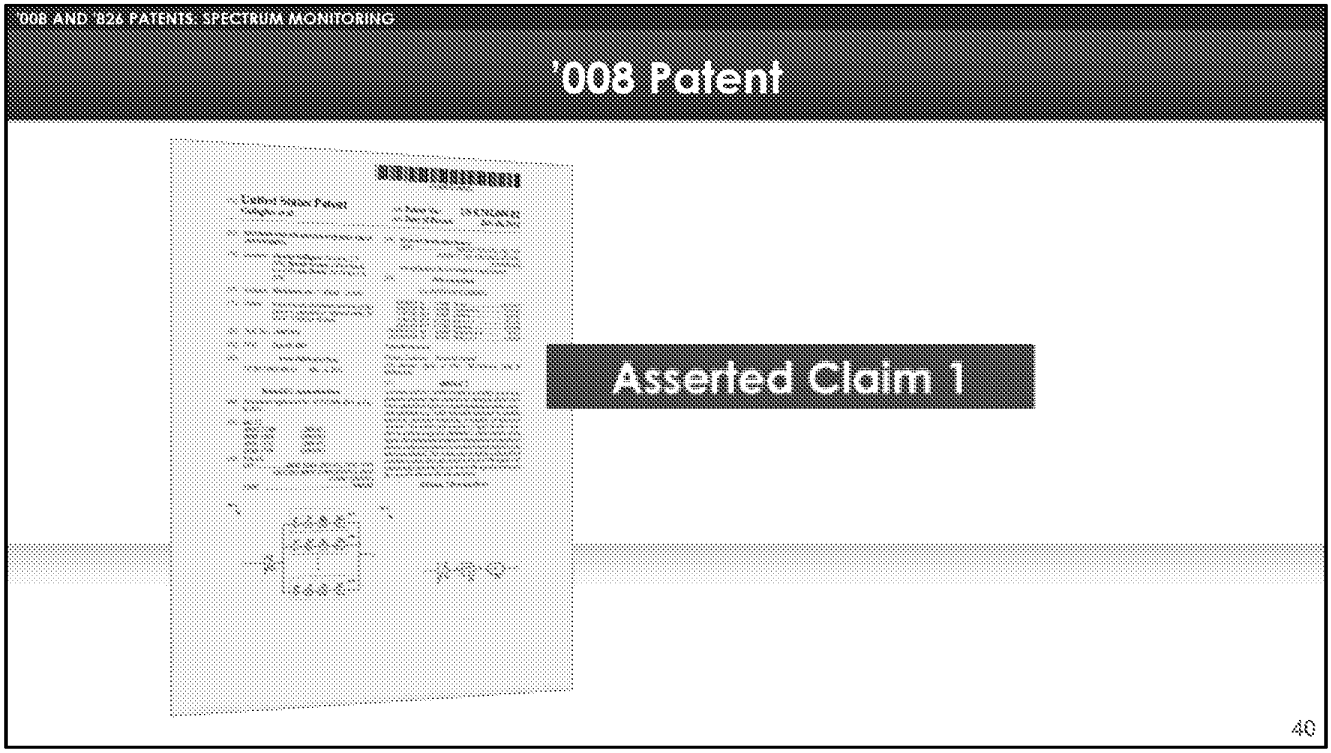



'008 Patent, 3:51-55

FIG. 1B

39

In the specification, the example given is an analysis of whether communication parameters of the received channels are outside acceptable bounds.




Now we'll take a brief look at some select claim limitations. Claim 1 is the only asserted independent claim in the 008 patent, so that's the claim we'll look at.

'008 AND '824 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

**1.** A system **comprising:**

**an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;**

**a signal monitor operable to:**

**analyze said digitized signal to determine a characteristic of said digitized signal; and**

**report said determined characteristic to a source of said received signal;**

**a data processor operable to process a television channel to recover content carried on the television channel; and**

**a channelizer operable to:**

**select a first portion of said digitized signal;**

**select a second portion of said digitized signal; and**

**concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.**

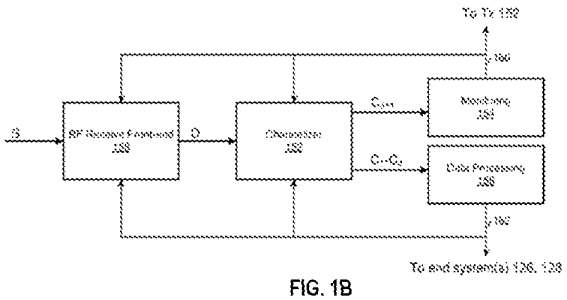



FIG. 1B

41

Claim 1 of the 008 patent is a system claim.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

**1. A system comprising:**

an analog-to-digital converter **operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;**

a signal monitor operable to:

analyze said digitized signal to determine a characteristic of said digitized signal; and

export said determined characteristic to a source of said received signal;

a data processor operable to process a television channel to recover content carried on the television channel; and

a channelizer operable to:

select a first portion of said digitized signal;

select a second portion of said digitized signal; and

concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

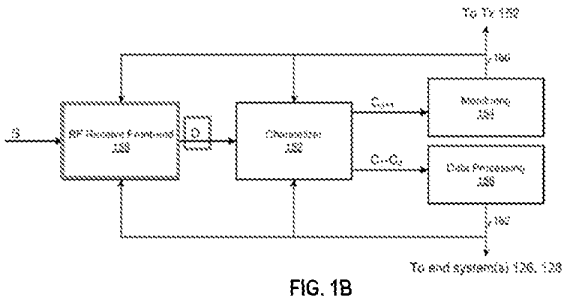



FIG. 1B

42

The first element of claim 1 is directed to an analog to digital converter, which corresponds to the RF Receive Front End 158 in figure 1B.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

1. A system comprising:
an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;

**a signal monitor operable to:**
**analyze said digitized signal to determine a characteristic of said digitized signal; and**

export said determined characteristic to a source of said received signal;
a data processor operable to process a television channel to recover content carried on the television channel; and
a channelizer operable to:
select a first portion of said digitized signal;
select a second portion of said digitized signal; and
concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

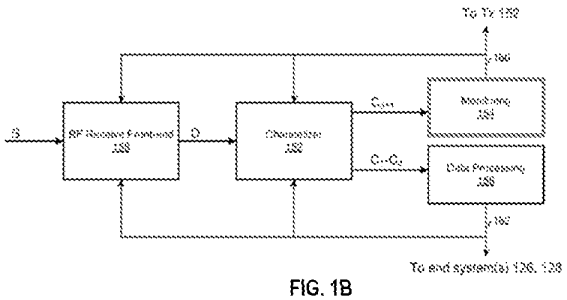



FIG. 1B

43

Next, the claim requires a signal monitor. The claimed signal monitor corresponds to the monitoring module 154 in figure 1B.

The claimed signal monitor is said to be operable to perform 2 functions.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

1. A system comprising:
an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;

**a signal monitor operable to:**
**analyze said digitized signal to** determine a characteristic of said digitized signal; **and**
export said determined characteristic to a source of said received signal;
a data processor operable to process a television channel to recover content carried on the television channel; and
a channelizer operable to:
select a first portion of said digitized signal;
select a second portion of said digitized signal; and
concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

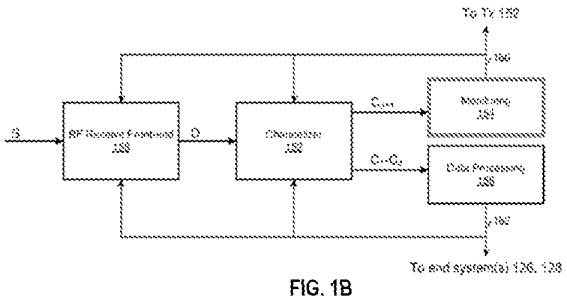


FIG. 1B

44

First, it is operable to determine a characteristic of the digitized signal.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

1. A system comprising:

an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;

a signal monitor operable to:

analyze said digitized signal to determine a characteristic of said digitized signal; and

**report said determined characteristic to a source of said received signal;**

a data processor operable to process a television channel to recover content carried on the television channel; and

a channelizer operable to:

select a first portion of said digitized signal;

select a second portion of said digitized signal; and

concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

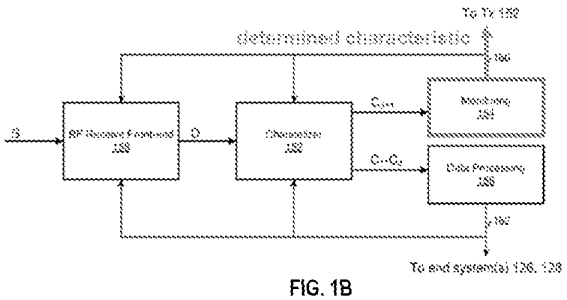



FIG. 1B

45

Second, the signal monitor reports that determined characteristic.

So in this claim, it is the determined characteristic itself that is reported back, not some analysis of the characteristic.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

1. A system comprising:

an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;

a signal monitor operable to:

analyze said digitized signal to determine a characteristic of said digitized signal; and

export said determined characteristic to a source of said received signal;

**a data processor operable to process a television channel to recover content carried on the television channel; and**

a channelizer operable to:

select a first portion of said digitized signal;

select a second portion of said digitized signal; and

concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

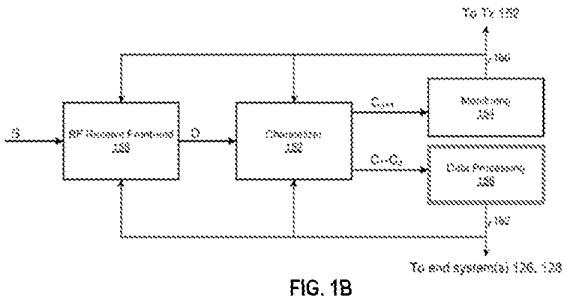



FIG. 1B

46

Next, the claim recites a data processor. This would correspond to the data processing module 156 in FIG. 1B.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

1. A system comprising:

an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;

a signal monitor operable to:

analyze said digitized signal to determine a characteristic of said digitized signal; and

export said determined characteristic to a source of said received signal;

a data processor operable to process a television channel to recover content carried on the television channel; and

a channelizer operable to:

select a first portion of said digitized signal;

select a second portion of said digitized signal; and

concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

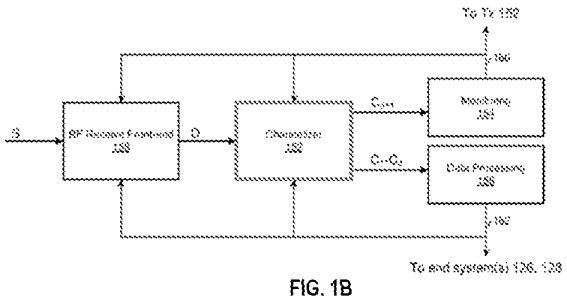



FIG. 1B

47

And finally, the claim requires a channelizer, which corresponds to channelizer 152 in Figure 1B.

The claimed channelizer is said to be operable to perform three tasks.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

1. A system comprising:

an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;

a signal monitor operable to:

analyze said digitized signal to determine a characteristic of said digitized signal; and

report said determined characteristic to a source of said received signal;

a data processor operable to process a television channel to recover content carried on the television channel; and

**a channelizer operable to:**

**select a first portion of said digitized signal;**

select a second portion of said digitized signal; and

concurrently **output said first portion of said digitized signal to said signal monitor** and said second portion of said digitized signal to said data processor.

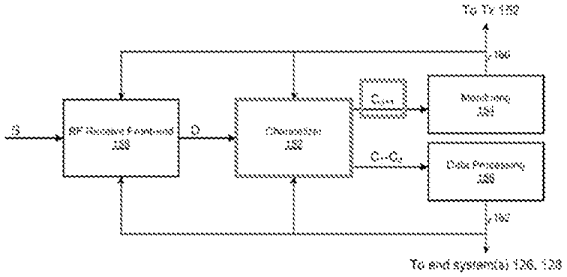



FIG. 1B

48

First, the channelizer selects a first portion of the digitized signal to output to the signal monitor.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

1. A system comprising:

an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;

a signal monitor operable to:

analyze said digitized signal to determine a characteristic of said digitized signal; and

report said determined characteristic to a source of said received signal;

a data processor operable to process a television channel to recover content carried on the television channel; and

**a channelizer operable to:**

select a first portion of said digitized signal;

**select a second portion of said digitized signal;** and

concurrently **output** said first portion of said digitized signal to said signal monitor and **said second portion of said digitized signal to said data processor.**

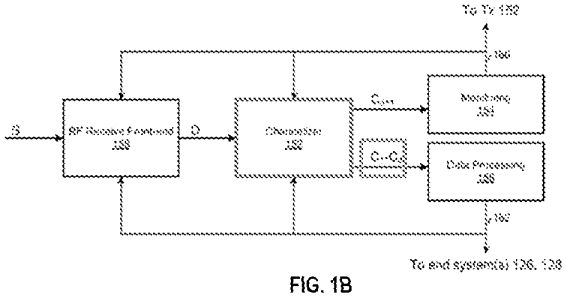



FIG. 1B

49

Second, the channelizer selects a second portion of the digitized signal to output to the data processor.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '008 Patent, Claim 1

1. A system comprising:

an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;

a signal monitor operable to:

analyze said digitized signal to determine a characteristic of said digitized signal; and

report said determined characteristic to a source of said received signal;

a data processor operable to process a television channel to recover content carried on the television channel; and

**a channelizer operable to:**

select a first portion of said digitized signal;

select a second portion of said digitized signal; and

**concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.**

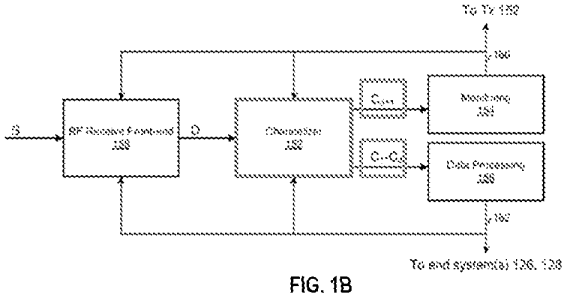
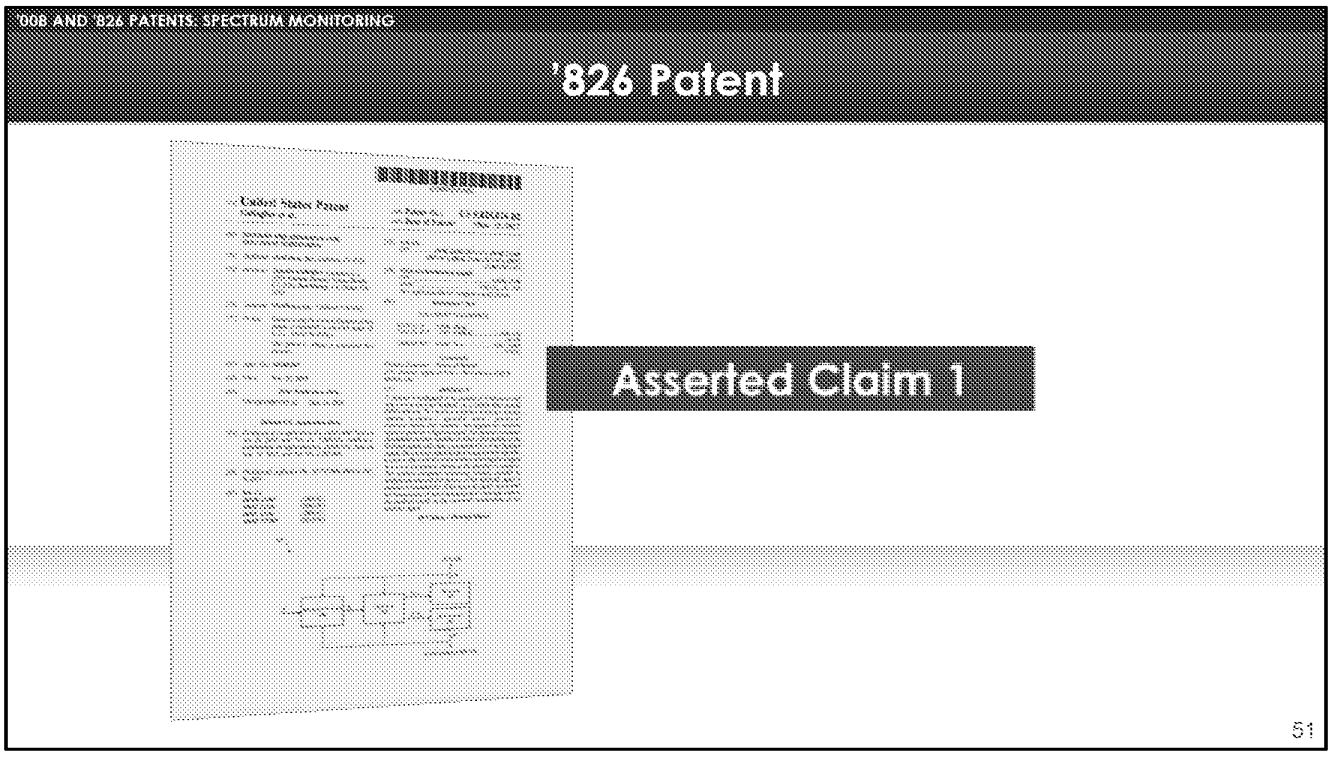



FIG. 1B

50

And third, the channelizer concurrently outputs the selected first portion and second portion to the signal monitor and the data processor, respectively.




Now we'll take a brief look at one specific limitation of claim 1 of the 826 patent.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '826 Patent, Claim 1

1. A method comprising:

**performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network:**

**receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels;**

**digitizing said received signal to generate a digitized signal;**

**selecting a first portion of said digitized signal;**

**selecting a second portion of said digitized signal;**

**processing said selected second portion of said digitized signal to recover information carried in said plurality of channels;**

**analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal; and**

**controlling the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.**

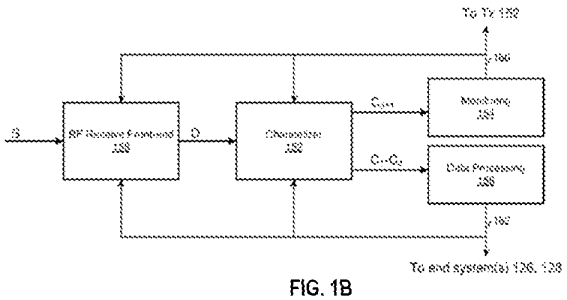



FIG. 1B

52

Claim 1 of the 826 patent is a method claim. In many respects, it simply recites the functions performed by the system claimed in the 008 patent.

'008 AND '826 PATENTS: SPECTRUM MONITORING

## '826 Patent, Claim 1

3. A method comprising:

performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network:

receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels;

digitizing said received signal to generate a digitized signal;

selecting a first portion of said digitized signal;

selecting a second portion of said digitized signal;

processing said selected second portion of said digitized signal to recover information carried in said plurality of channels;

analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal; and

**controlling the transmission of** network management messages back to said headend based on said measured characteristic **of said received signal,** wherein said measured characteristic is different than said network management messages.

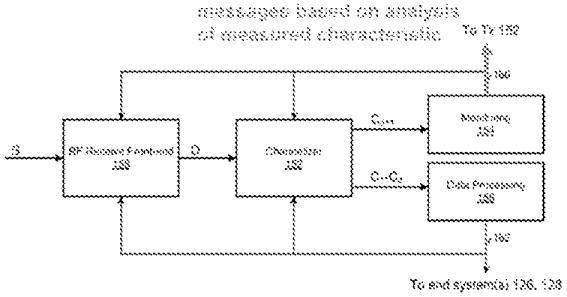
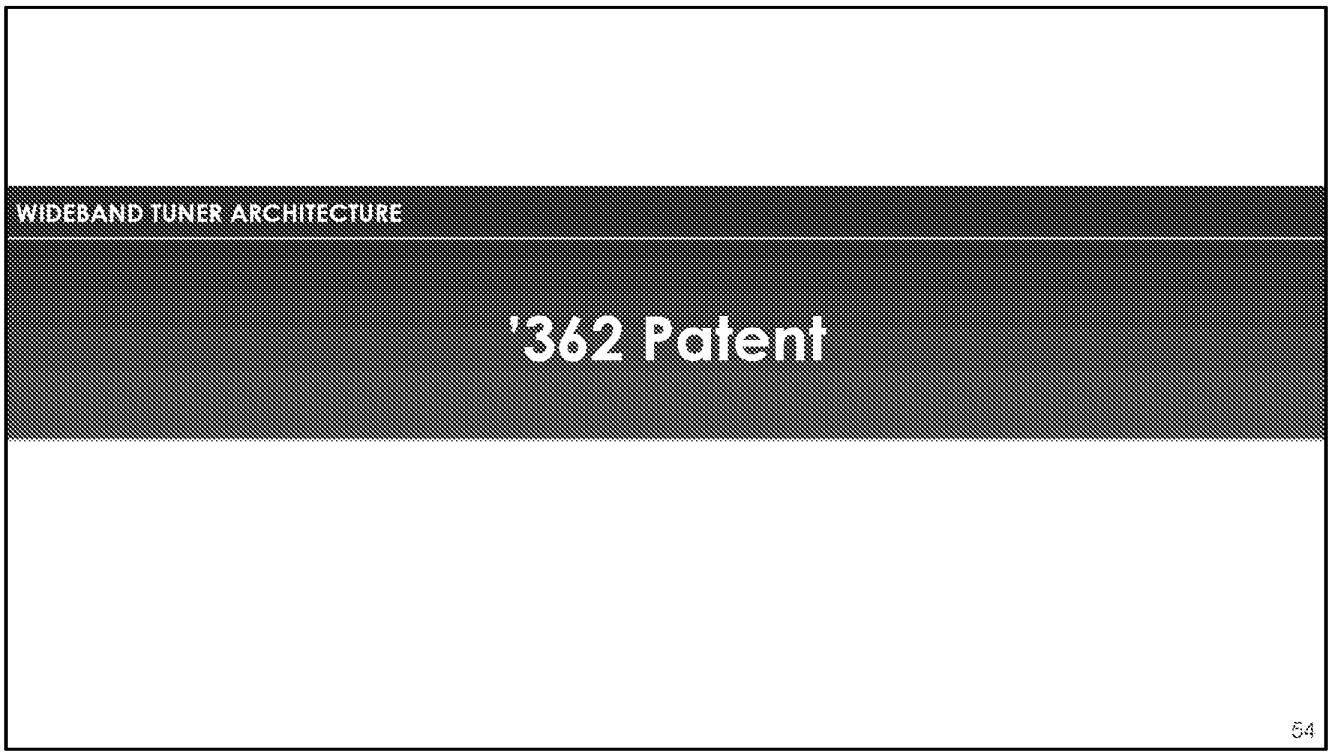



FIG. 1B

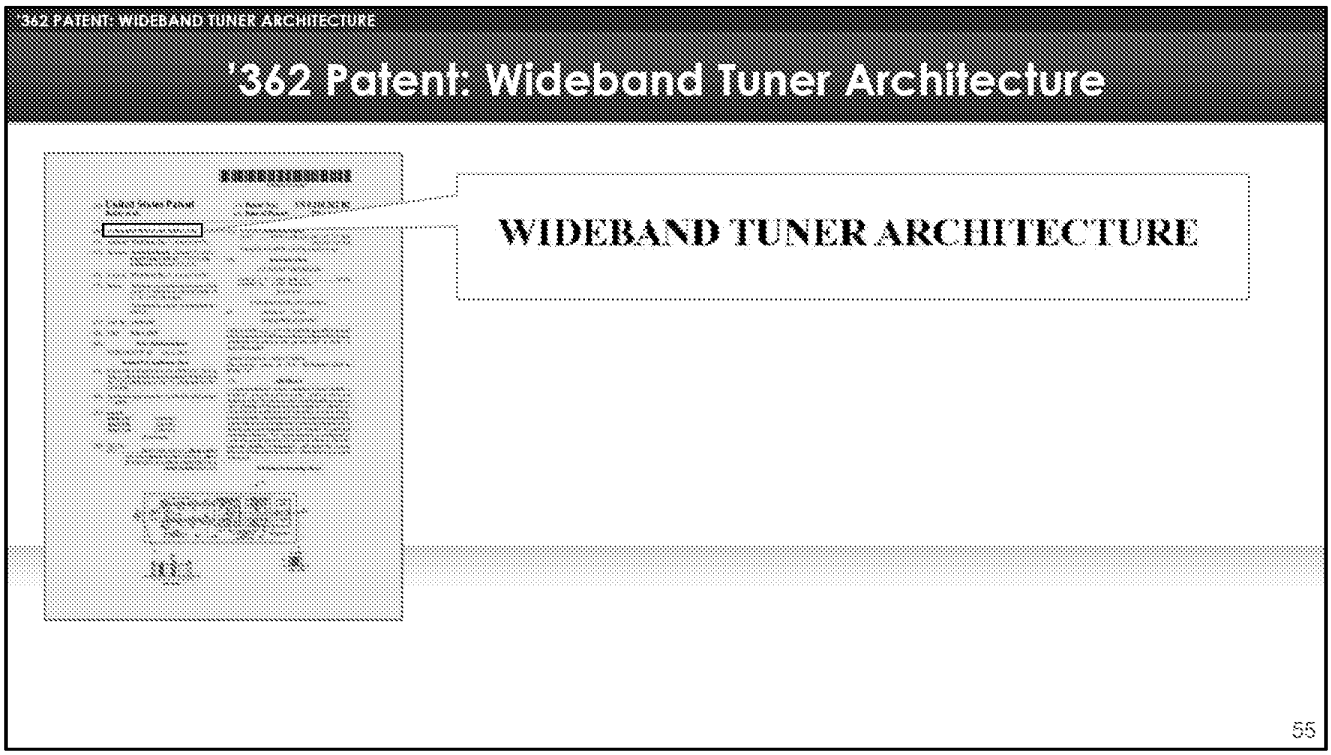
53

However, one important difference between this claim and claim 1 of the 008 patent is reflected by the last step of this claim, which we've annotated in green. In this claim, after measuring a characteristic of the signal, what is reported back to the headend is not the measured characteristic itself as in the 008 patent, but instead network management messages that are different than the measured characteristic.

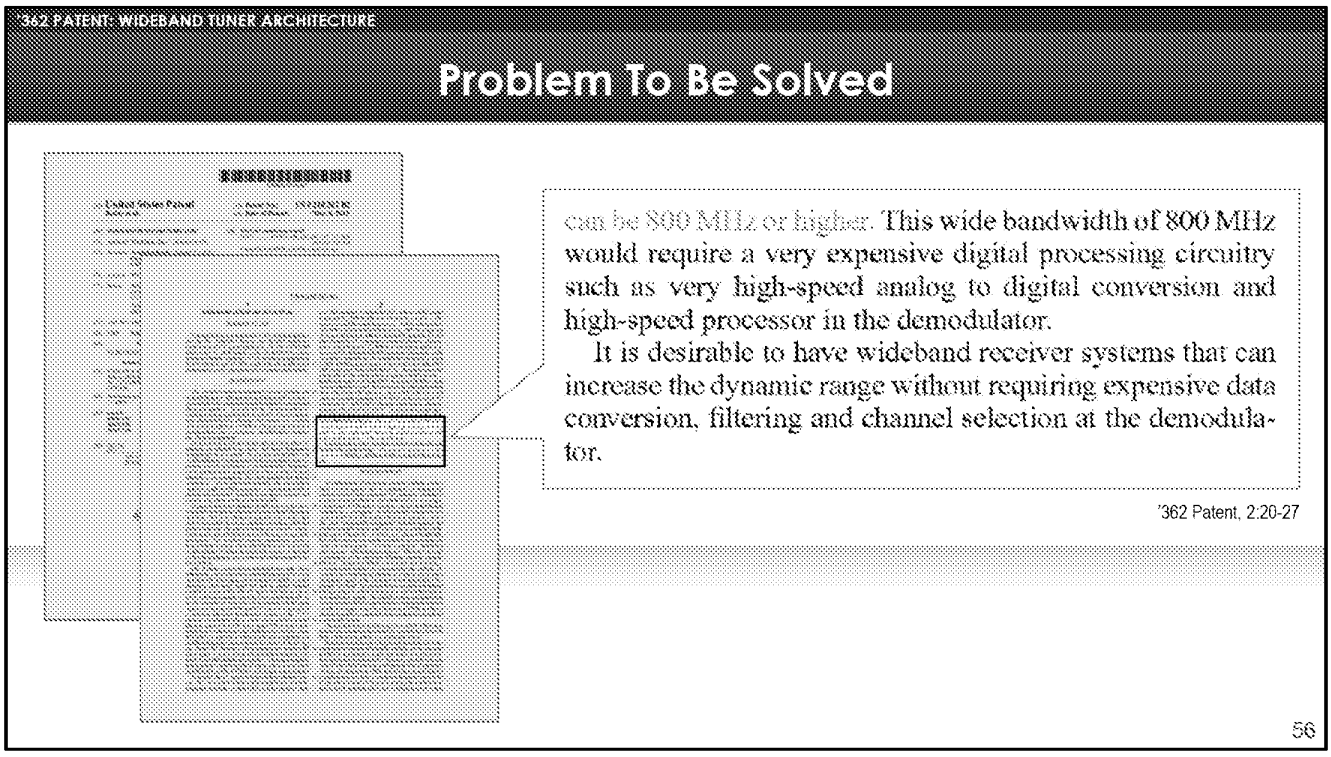
In other words, this claim is directed to the disclosed embodiment where the monitoring module performs an analysis of the measured characteristic and reports the results of that analysis back to the headend.




Now we'll turn to the 362 patent.




As I mentioned earlier, the 362 patent is directed to an allegedly novel architecture for a wideband tuner.




According to the patent, existing wideband tuners required expensive analog to digital converters because of the wide bandwidth of the signal that had to be converted.

The objective of the 362 patent is to reduce the bandwidth of the signal to be digitized so that expensive analog to digital converters are not required.

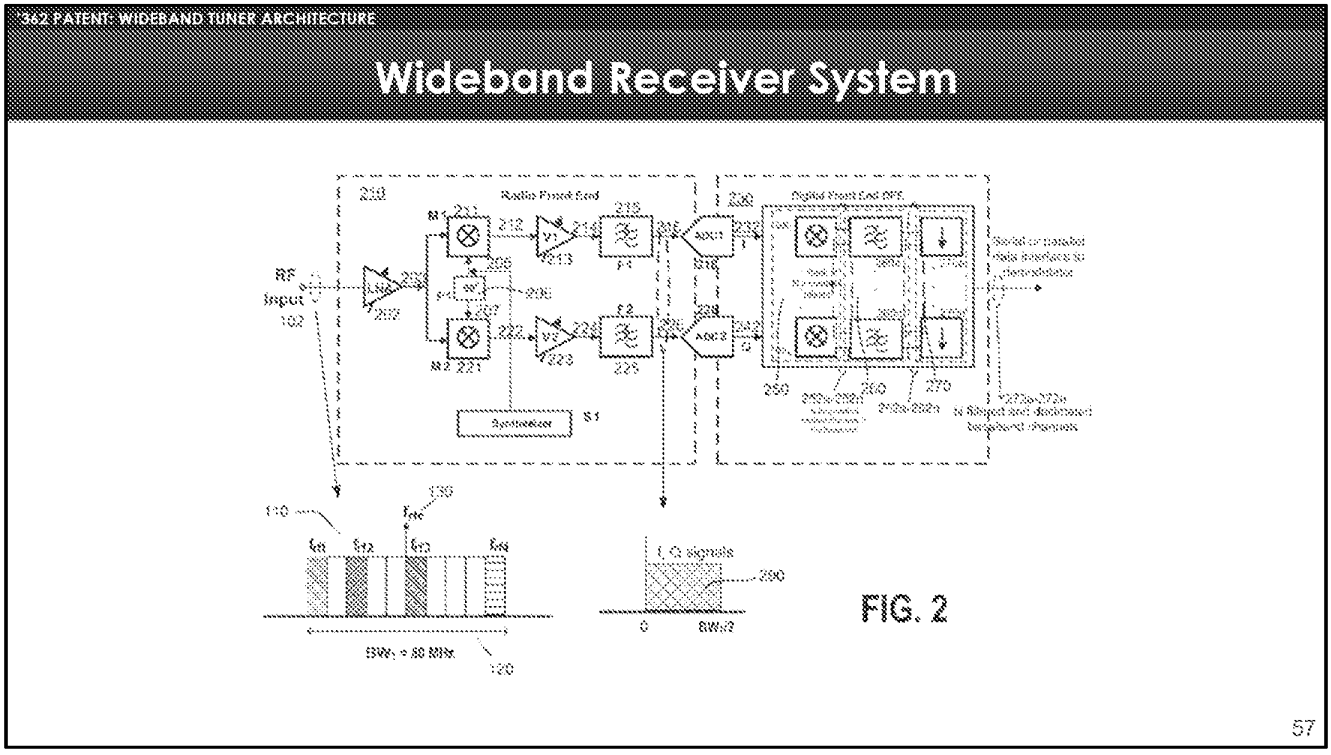



Figure 2 of the 362 patent depicts a wideband receiver system architecture which allegedly solves this problem.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Wideband Receiver System

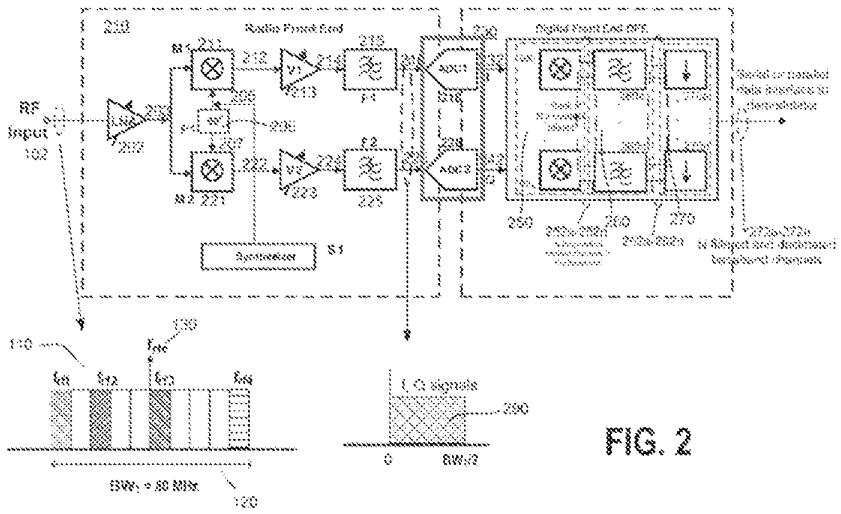


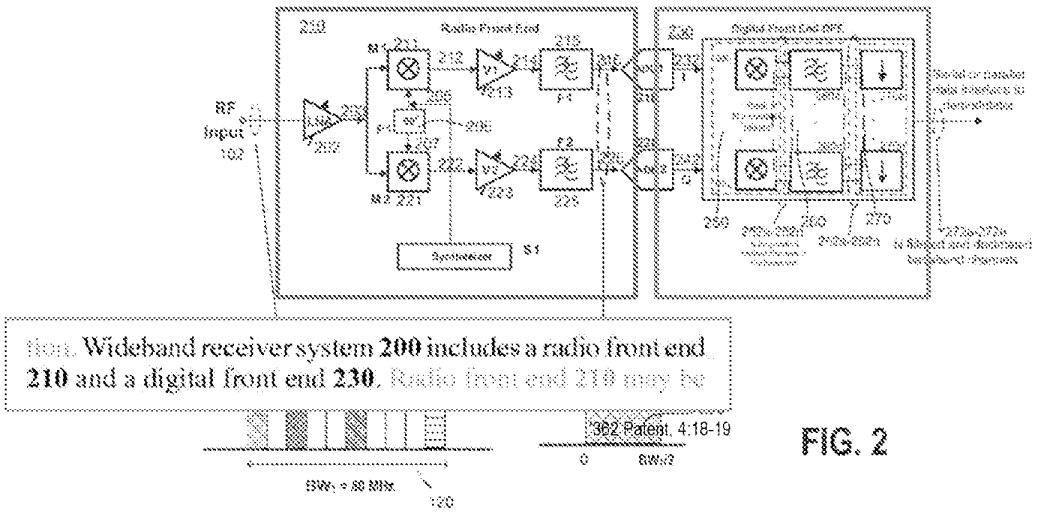
FIG. 2

58

We've put a red box around the analog to digital converters in question. The objective of the alleged invention is to reduce the bandwidth of the signal to be supplied to these converters.

We'll now look at how that is done.

## Radio Front End / Digital Front End



Note. Wideband receiver system **200** includes a radio front end **210** and a digital front end **230**. Radio front end 210 may be

362 Patent, 4:18-19

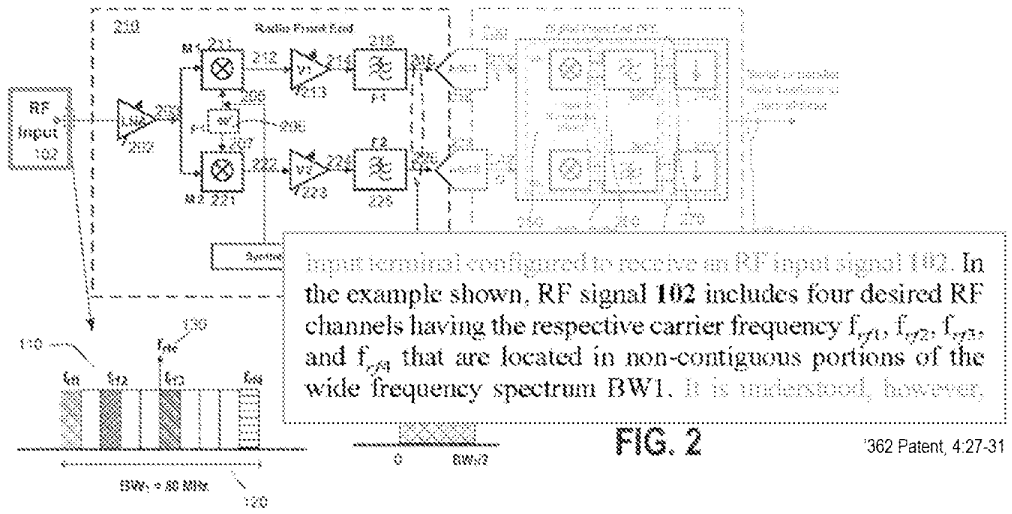
FIG. 2



The analog to digital converters sit between two so-called front end components of the wideband receiver -- a radio front end which we've annotated in red, and a digital front end which we've annotated in green.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Incoming Signal Contains Non-Contiguous Desired Channels




Input terminal configured to receive an RF input signal **102**. In the example shown, RF signal **102** includes four desired RF channels having the respective carrier frequency $f_{c/1}$, $f_{c/2}$, $f_{c/3}$, and $f_{c/4}$ that are located in non-contiguous portions of the wide frequency spectrum BW1. It is understood, however,

FIG. 2

'362 Patent, 4:27-31

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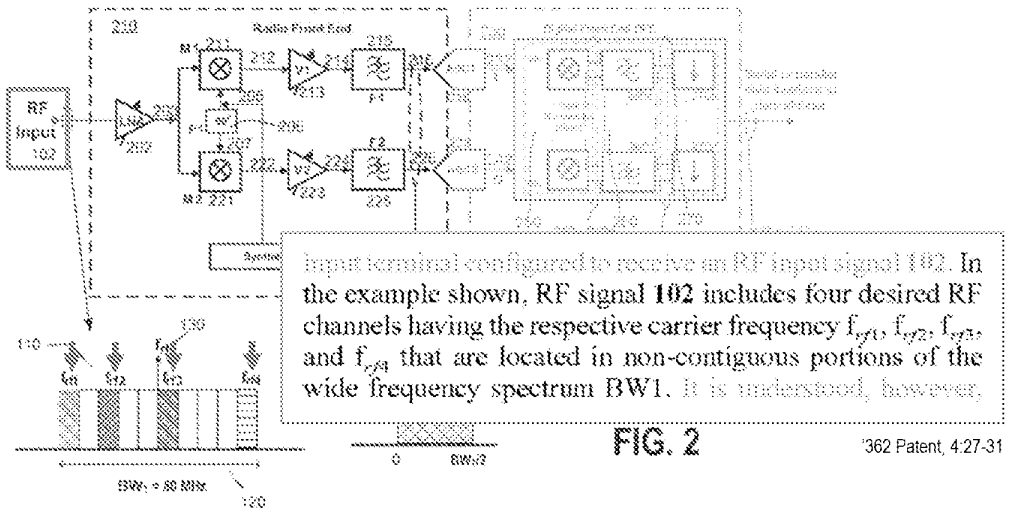
The incoming signal is received into the radio front end at the left of the figure. This signal is referred to as the RF input.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

# Incoming Signal Contains Non-Contiguous Desired Channels




Input terminal configured to receive an RF input signal 102. In the example shown, RF signal **102** includes four desired RF channels having the respective carrier frequency $f_{rf1}$, $f_{rf2}$, $f_{rf3}$, and $f_{rf4}$ that are located in non-contiguous portions of the wide frequency spectrum BW1. It is understood, however,

FIG. 2

'362 Patent, 4:27-31

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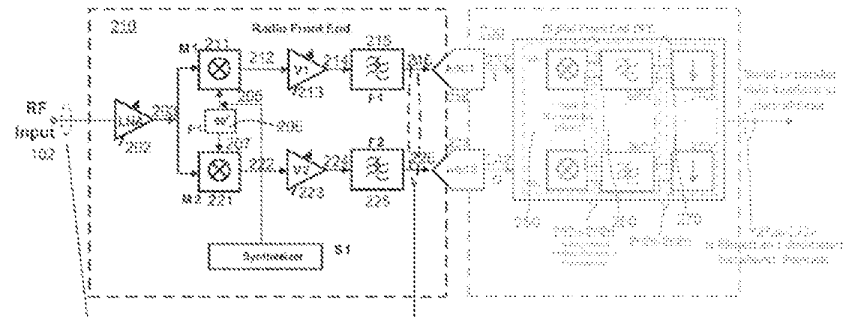
The incoming signal in this example contains 4 desired TV channels. That is, 4 channels the customer might like to view. We have indicated those 4 channels in red. Notice that those 4 channels are not next to each other. They are not contiguous.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Initial Bandwidth: $BW_1$



210 and a digital front end 230. Radio front end **210** may be a single very wide-band tuner receiver that captures the desired swath of channels located in non-contiguous portions of the spectrum having a frequency bandwidth BW1 120. In

'362 Patent, 4:19-22

62

According to the specification, the radio front end somehow captures a swath of channels that includes the desired channels. We've annotated that swath in blue. This desired swath of channels has a bandwidth B W 1, which we've annotated in green.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Low Noise Amplifier

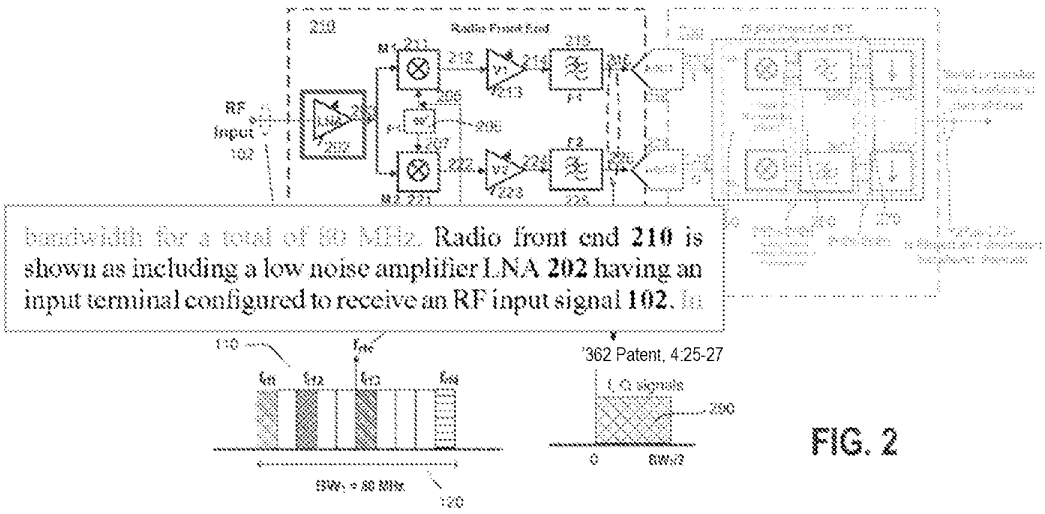


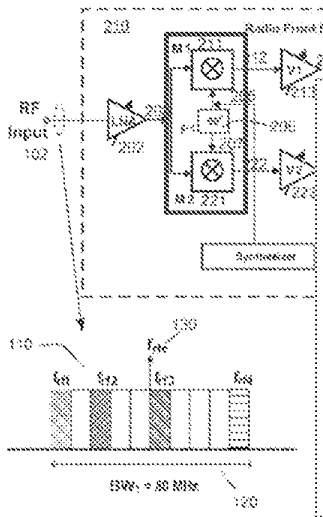

FIG. 2

63

This desired swath of channels is first sent to a low noise amplifier annotated in blue.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Mixer Module



Mixers M1 **211** and M2 **221** may be conventional mixers formed using, for example, differential Gilbert cells. Each of the mixers **211** and **221** multiplies (mixes) an amplified RF signal **203** with a respective first oscillator frequency signal **205** and a second oscillator frequency signal **207** to generate an in-phase signal **212** and a quadrature signal **222** that have a phase shift of 90° degree between them. Mixers **211** and **221** are identical so that the amplitude of the in-phase signal **212** and quadrature signal **222** are the same. The first and second oscillator frequencies **205** and **207** are identical and have a 90° degree phase shift generated through a 90° degree phase shifter P1 **206**. Synthesizer S1 may be a single local oscillator operable to generate the oscillator frequency **205** for converting the receive RF signal **102** to a zero-IF or low-IF band.

'362 Patent, 4:40-53

64

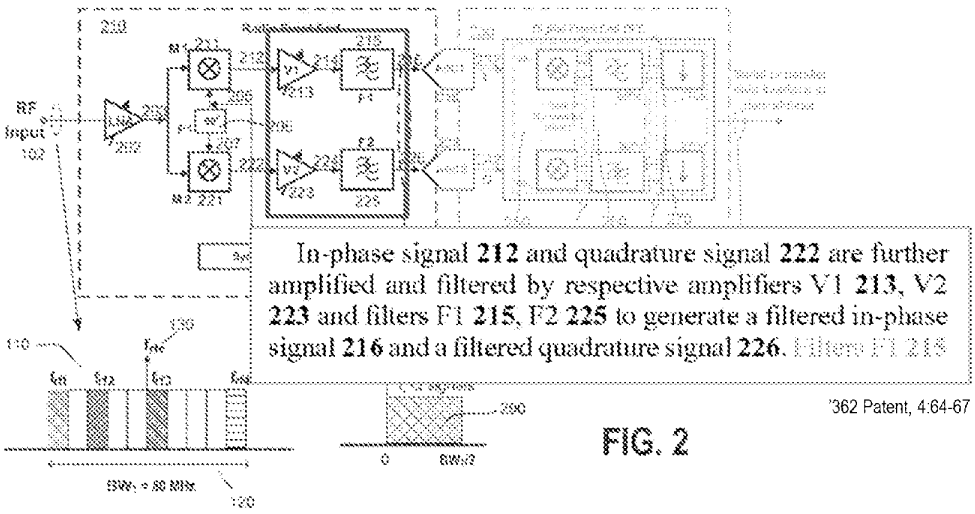
Next, the amplified signal is provided as input to a mixer module, annotated in purple. The mixer module performs two functions:

First, the signal is "down-converted," meaning the received signal is shifted to a lower range of frequencies. This is described in the language from the specification we've highlighted in green.

Second, the mixer module generates I and Q signals. The details of I and Q signals are beyond the scope of this technology tutorial, but they refer to in-phase and quadrature components of the signal.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Amplifiers/Filters




'362 Patent, 4:64-67

FIG. 2

65

Next, the signals are sent to amplifiers and filters.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## A-D Converters

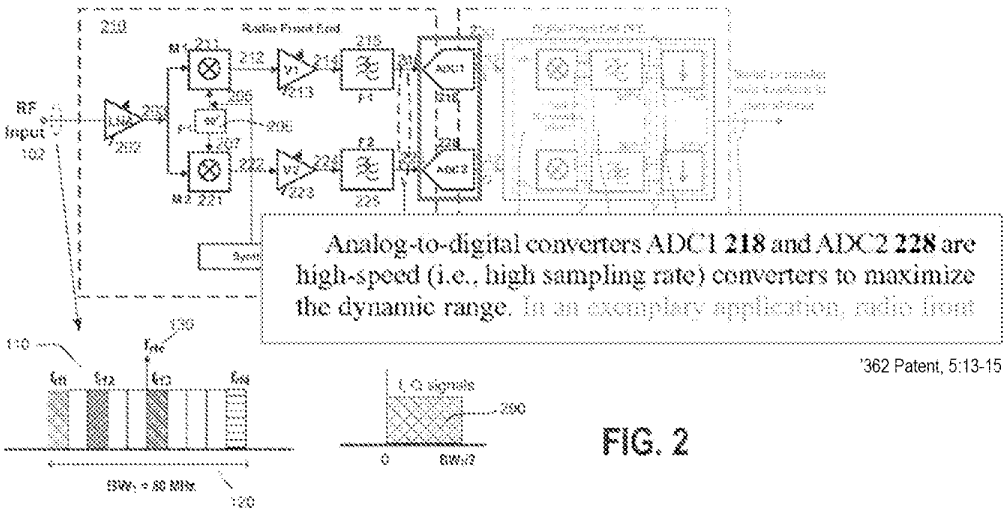



FIG. 2

66

And after this, the signals are provided as input to the analog to digital converters we discussed earlier.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Bandwidth Reduced by Half

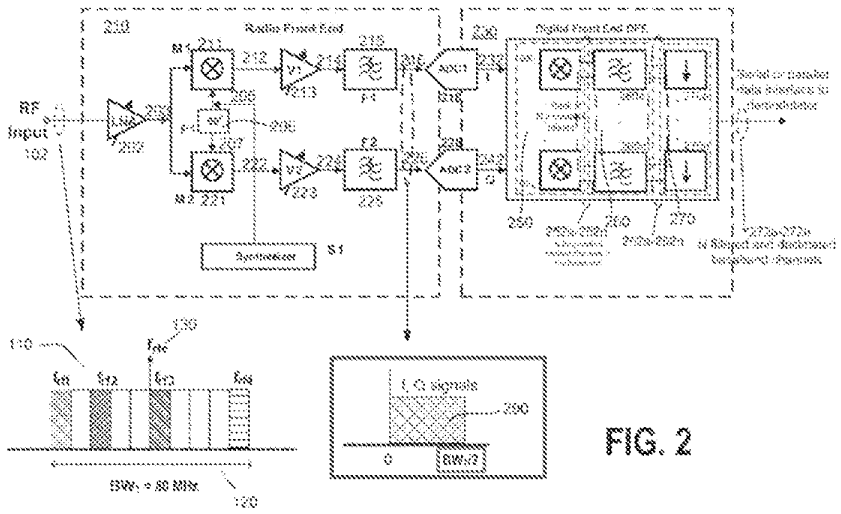


FIG. 2

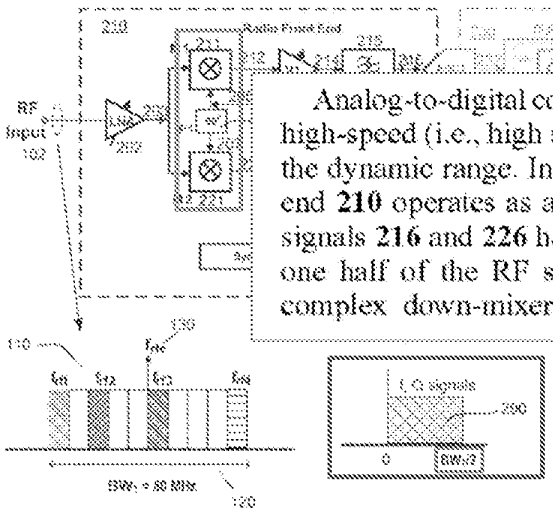
67

Notice, as we have annotated in red in figure 2, that that bandwidth of the signal supplied to the analog to digital converters is one half of the initial bandwidth BW 1.

That is the reduction in bandwidth which allows less expensive analog to digital converters to be used.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Mixer Module 211 Achieves the Bandwidth Reduction



Analog-to-digital converters ADC1 **218** and ADC2 **228** are high-speed (i.e., high sampling rate) converters to maximize the dynamic range. In an exemplary application, radio front end **210** operates as a nominal zero-IF down-mixer so that signals **216** and **226** have a nominal bandwidth **290** equal to one half of the RF signal bandwidth BW1 thanks to the complex down-mixer architecture. In other embodiment,

'362 Patent, 5:13-19

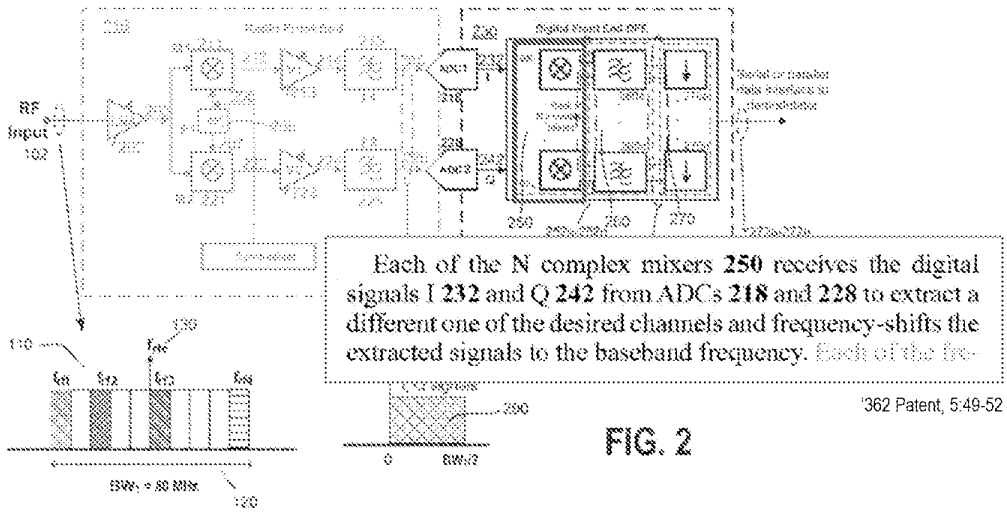
FIG. 2

68

And as the specification explains, it is the mixer module 211 annotated in green, that achieves this reduction in bandwidth.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Mixers to Extract Desired Channels




'362 Patent, 5:49-52

FIG. 2

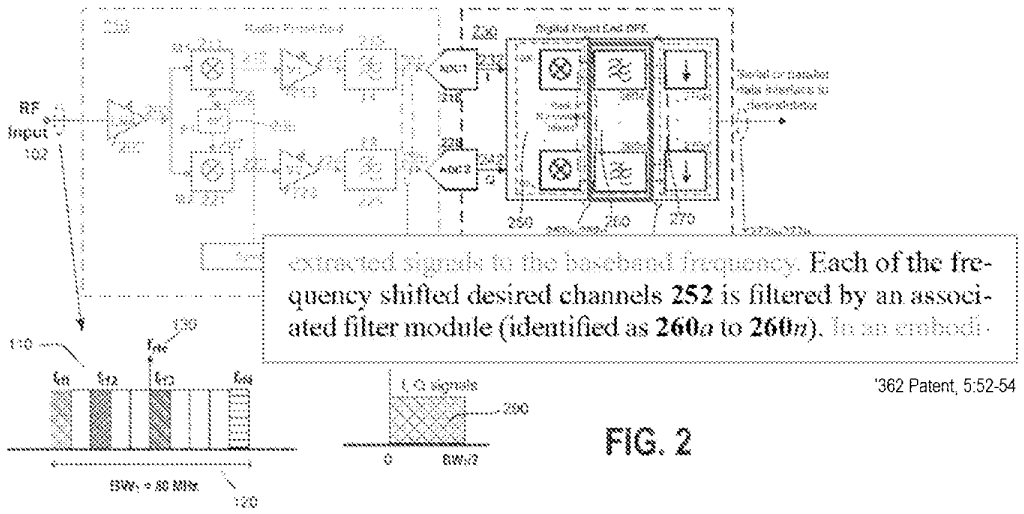
69

After analog to digital conversion, the digitized signals are sent to mixers which extract the desired channels.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

# Filter Module

**Filter Module**




extracted signals to the baseband frequency. Each of the frequency shifted desired channels **252** is filtered by an associated filter module (identified as **260***a* to **260***n*). In an embodi-

'362 Patent, 5:52-54

FIG. 2

70

Once extracted, each of the desired channels is provided to a filter module.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## Demodulators

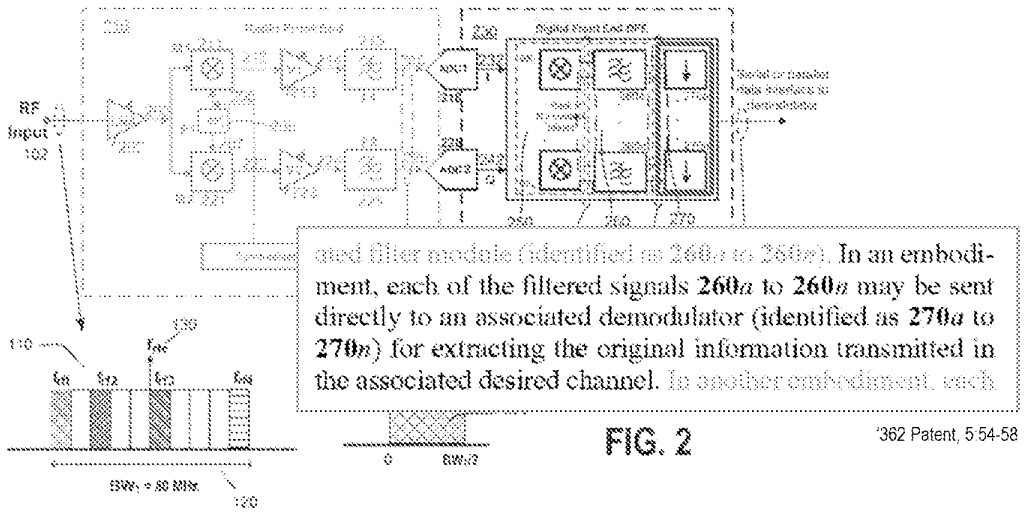



FIG. 2

'362 Patent, 5:54-58

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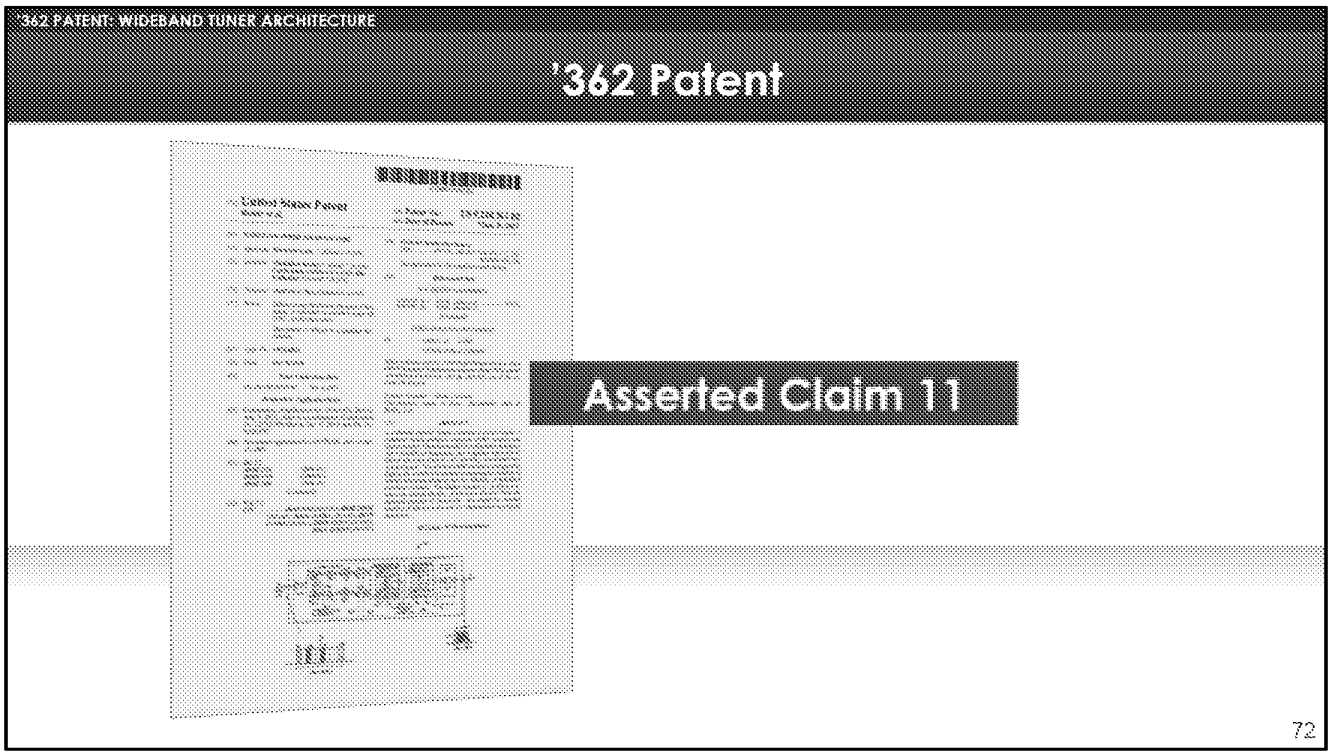
Each of the filtered signals is then provided to an associated demodulator, which extracts the information in the desired channels.




Now we will briefly look at some select limitations of claim 11 of the 362 patent, which is the only asserted independent claim.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## '362 Patent, Claim 11

**11. A method comprising:**

**in a wideband receiver system:**

down-converting, by a mixer module of said wideband receiver system, a plurality of frequencies that comprises a plurality of desired television channels and a plurality of undesired television channels;

digitizing, by a wideband analog-to-digital converter (ADC) module of said wideband receiver system, said plurality of frequencies comprising said plurality of desired television channels and said plurality of undesired television channels;

selecting, by digital circuitry of said wideband receiver system, said plurality of desired television channels from said digitized plurality of frequencies; and

outputting, by said digital circuitry of said wideband receiver system, said selected plurality of television channels to a demodulator as a digital datastream.

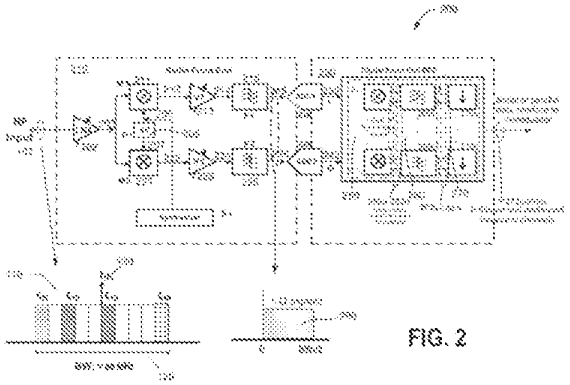


FIG. 2

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Claim 11 is a method claim, whereby the steps are carried out in in a wideband receiver system.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## '362 Patent, Claim 11

11. A method comprising:

in a wideband receiver system:

**downconverting, by a mixer module of said wideband receiver system, a plurality of frequencies that comprises a plurality of desired television channels and a plurality of undesired television channels;**

digitizing, by a wideband analog-to-digital converter (ADC) module of said wideband receiver system, said plurality of frequencies comprising said plurality of desired television channels and said plurality of undesired television channels;

selecting, by digital circuitry of said wideband receiver system, said plurality of desired television channels from said digitized plurality of frequencies; and

outputting, by said digital circuitry of said wideband receiver system, said selected plurality of television channels to a demodulator as a digital datastream.

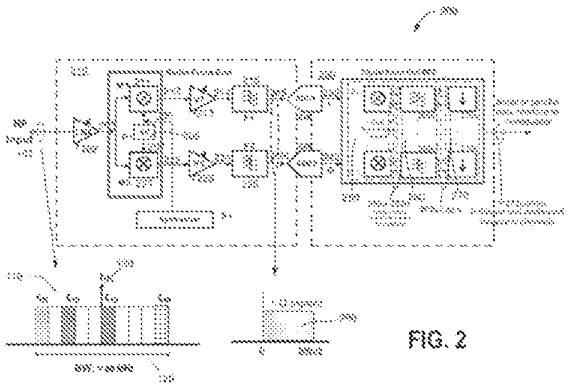

FIG. 2

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The claim begins with the step of down converting by a mixer module  This corresponds to the functions of mixer module 211.

## '362 Patent, Claim 11

11. A method comprising:

in a wideband receiver system:

down-converting, by a mixer module of said wideband receiver system, a plurality of frequencies that comprises a plurality of desired television channels and a plurality of undesired television channels;

**digitizing, by a wideband analog-to-digital converter (ADC) module of said wideband receiver system, said plurality of frequencies comprising said plurality of desired television channels and said plurality of undesired television channels;**

selecting, by digital circuitry of said wideband receiver system, said plurality of desired television channels from said digitized plurality of frequencies; and

outputting, by said digital circuitry of said wideband receiver system, said selected plurality of television channels to a demodulator as a digital datastream.

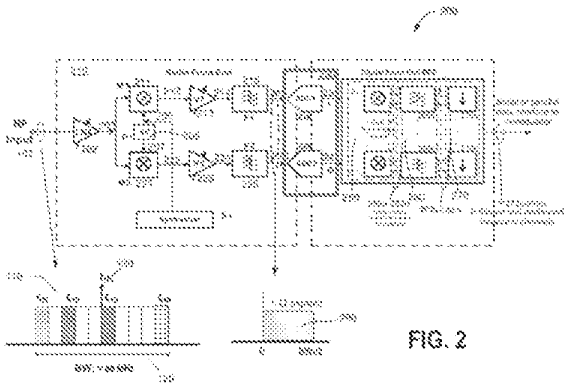

FIG. 2

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Next, the claim requires digitizing by an analog-to-digital converter module.

We've annotated figure 2 to indicate the analog to digital converters in red.

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## '362 Patent, Claim 11

11. A method comprising:

in a wideband receiver system:

downconverting, by a mixer module of said wideband receiver system, a plurality of frequencies that comprises a plurality of desired television channels and a plurality of undesired television channels;

digitizing, by a wideband analog-to-digital converter (ADC) module of said wideband receiver system, said plurality of frequencies comprising said plurality of desired television channels and said plurality of undesired television channels;

**selecting, by digital circuitry of said wideband receiver system, said plurality of desired television channels from said digitized plurality of frequencies; and**

outputting, by said digital circuitry of said wideband receiver system, said selected plurality of television channels to a demodulator as a digital datastream.

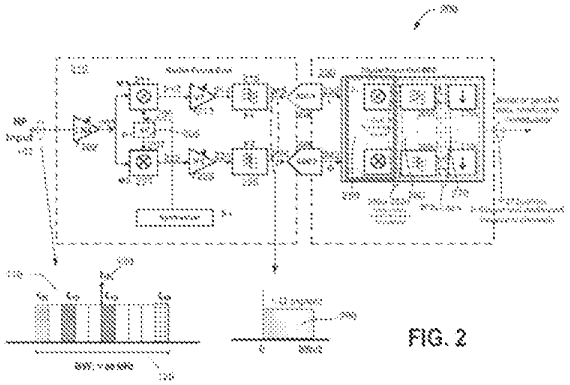

FIG. 2

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After the digitization, the claim requires that digital circuitry select the desired television channels

'362 PATENT: WIDEBAND TUNER ARCHITECTURE

## '362 Patent, Claim 11

11. A method comprising:

in a wideband receiver system:

downconverting, by a mixer module of said wideband receiver system, a plurality of frequencies that comprises a plurality of desired television channels and a plurality of undesired television channels;

digitizing, by a wideband analog-to-digital converter (ADC) module of said wideband receiver system, said plurality of frequencies comprising said plurality of desired television channels and said plurality of undesired television channels;

selecting, by digital circuitry of said wideband receiver system, said plurality of desired television channels from said digitized plurality of frequencies; and

**outputting, by said digital circuitry of said wideband receiver system, said selected plurality of television channels to a demodulator as a digital datastream.**

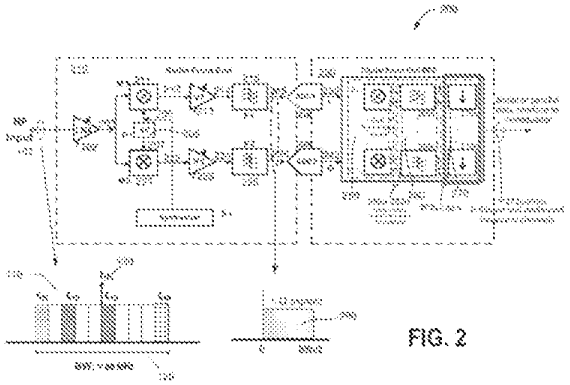

FIG. 2

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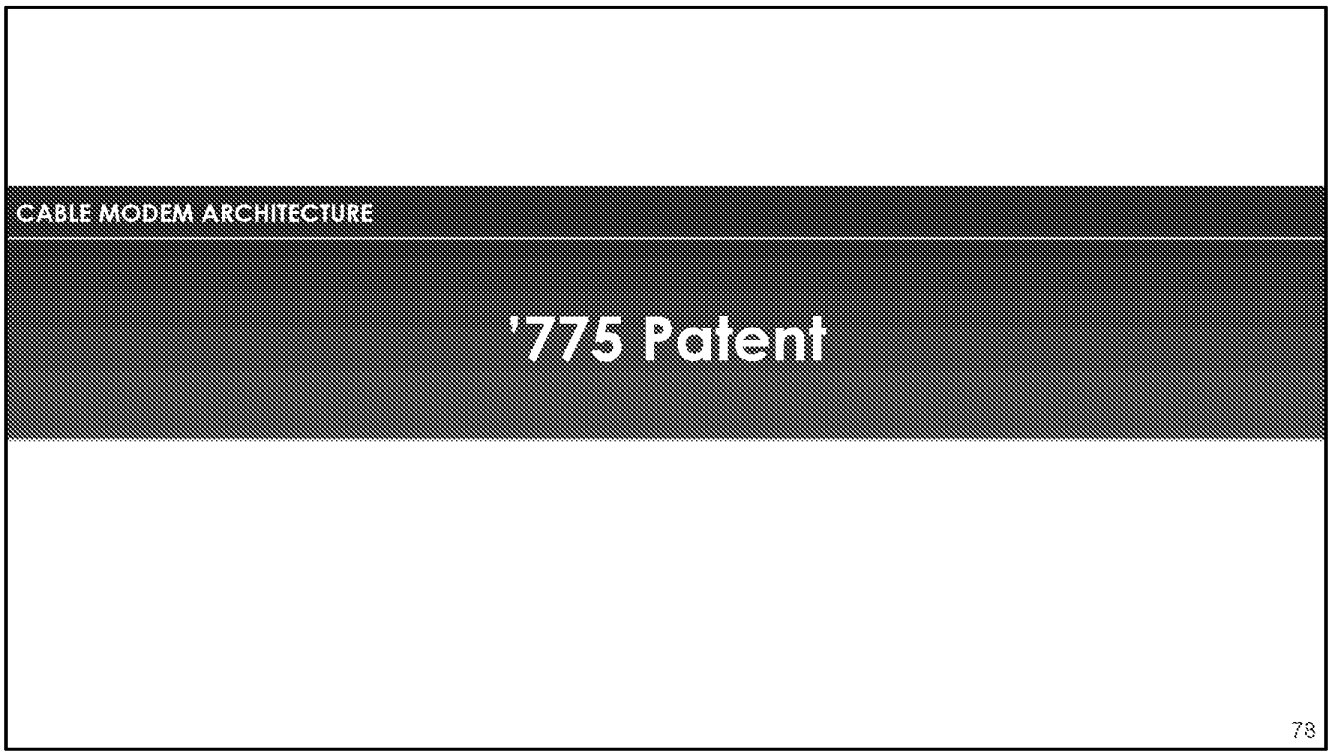
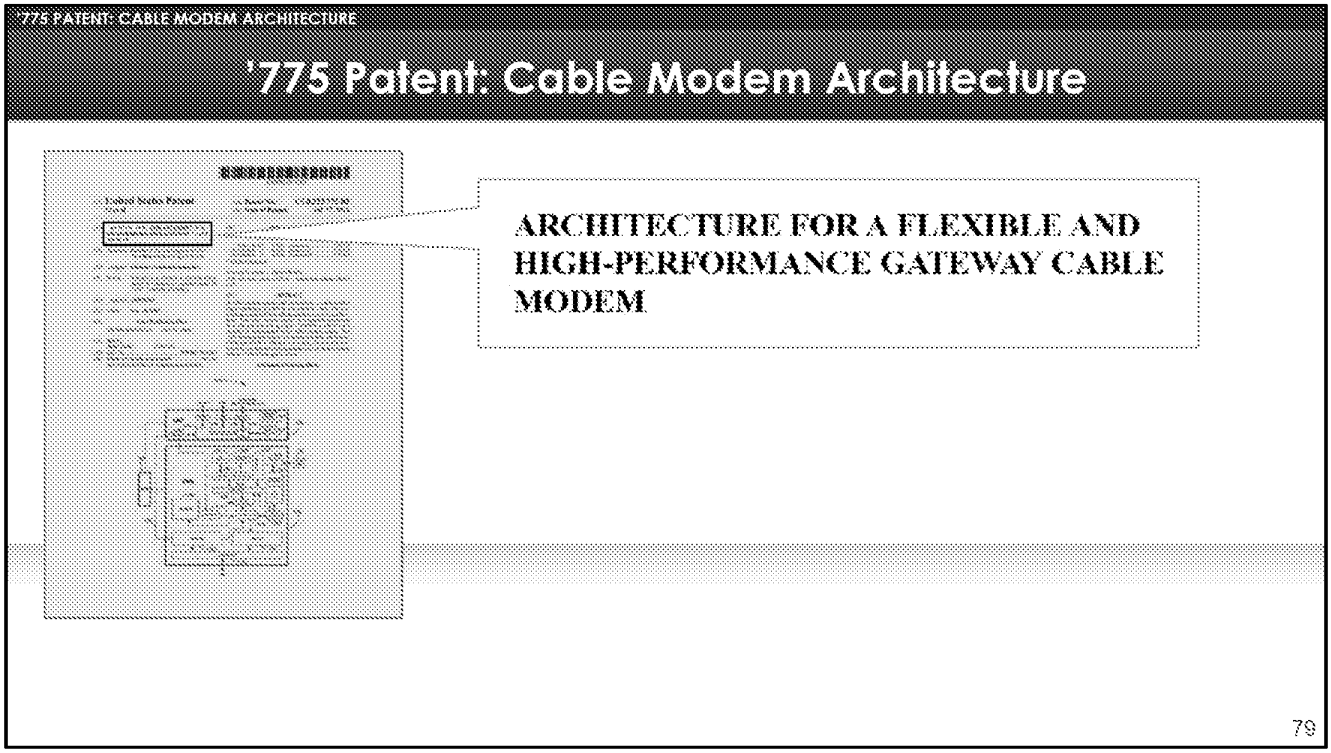
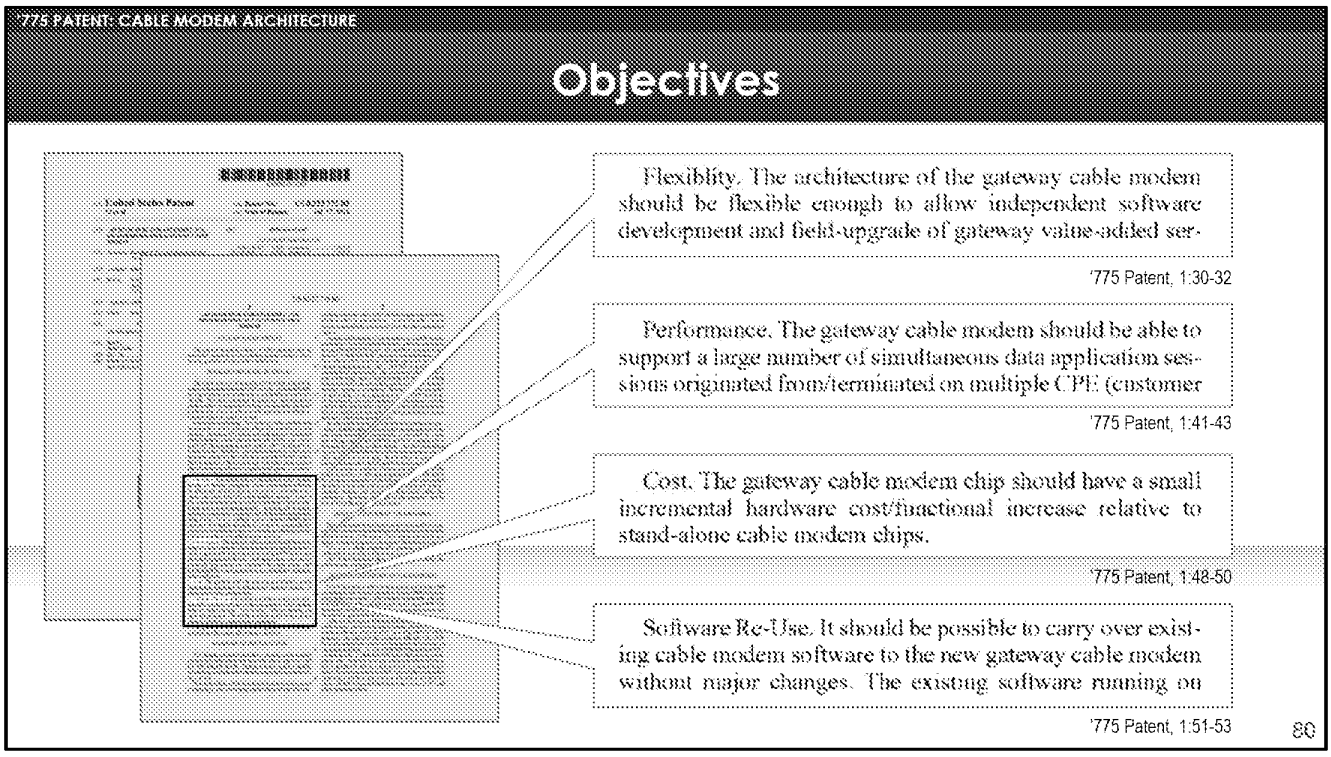
And output the selected channels to a demodulator.



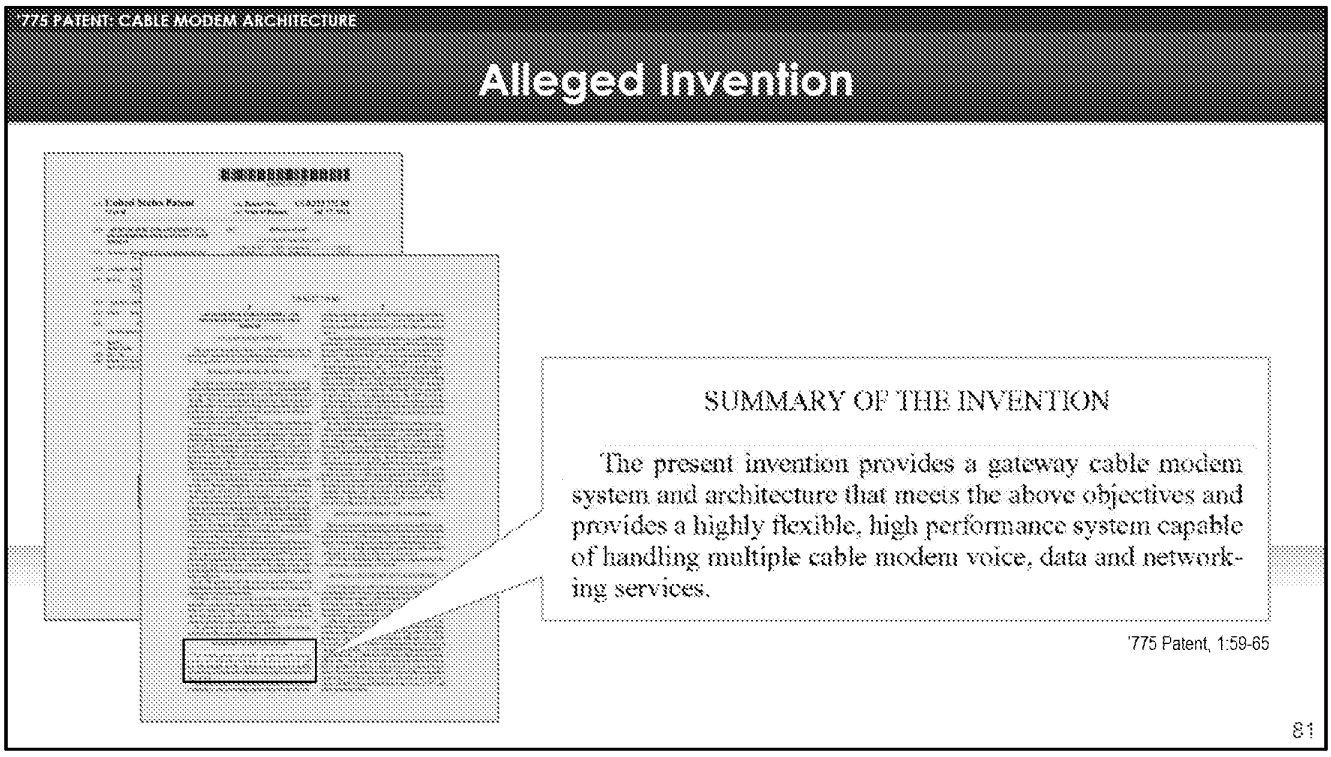

Now we will discuss the 775 patent.




As I mentioned earlier, the 775 patent is directed to an allegedly new architecture for a cable modem.




The specification identifies a number of objectives for a new cable modem, such as flexibility, performance, cost and software re-use.




The alleged invention is a cable modem architecture which meets all of these objectives

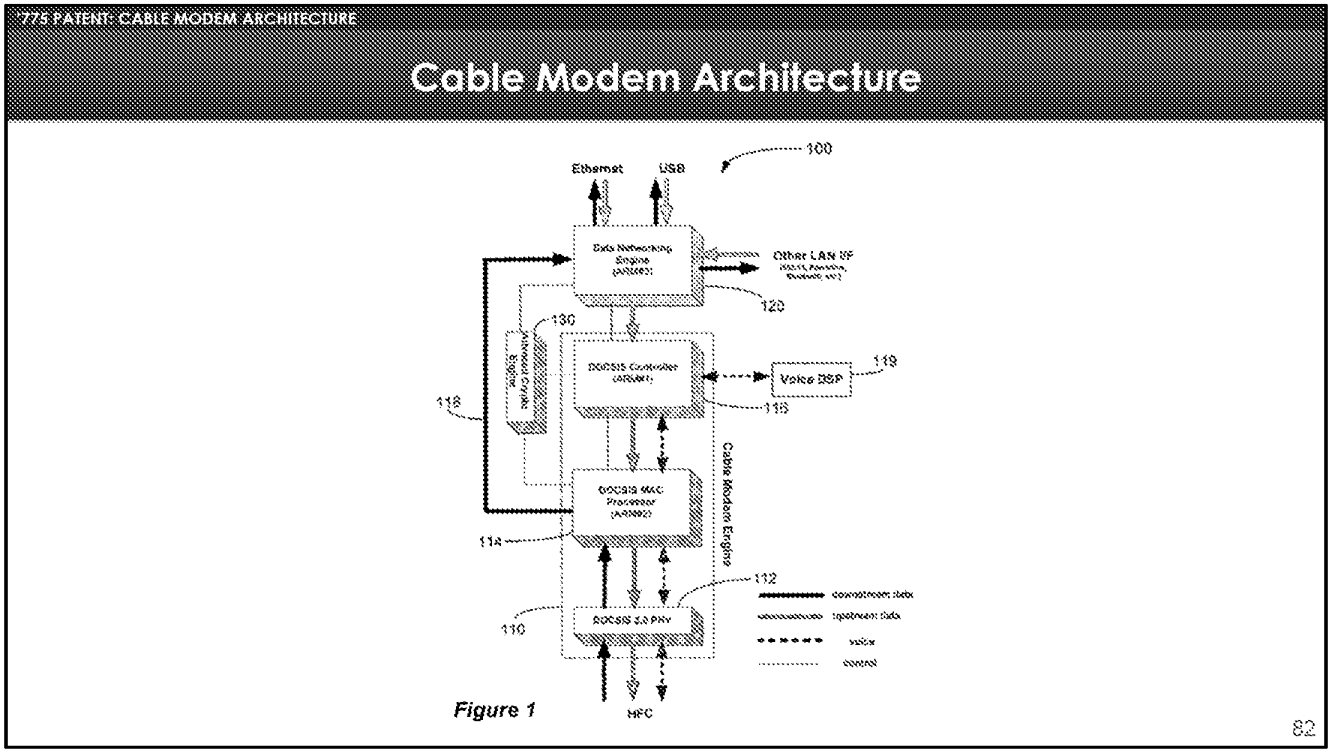



Figure 1 of the patent depicts the disclosed cable modem architecture. It is described as being the architecture of cable modem 100.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Architecture

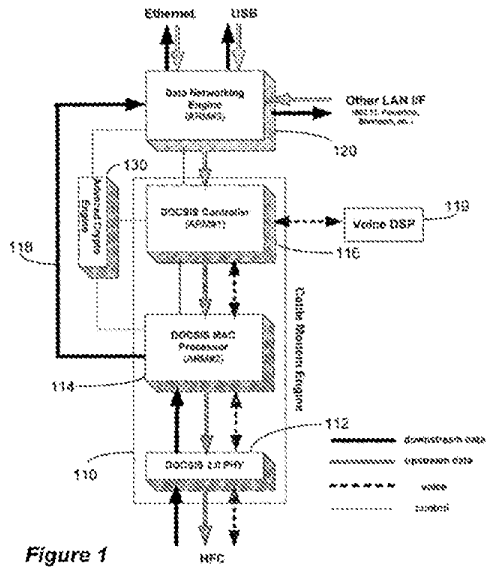



Figure 1

architecture. The architecture includes a cable modem engine having a DOCSIS PHY layer with a hardware transmitter and receiver, a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications, and a DOCSIS controller implementing VoIP functionality. The architecture also includes a data networking engine implementing all data networking processing and home networking applications. The data networking engine is completely decoupled from the cable modem engine. In one implementation, the VoIP functional-

'775 Patent, 2:6-15

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According to the specification, there are several distinct aspects to this cable modem architecture

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Engine

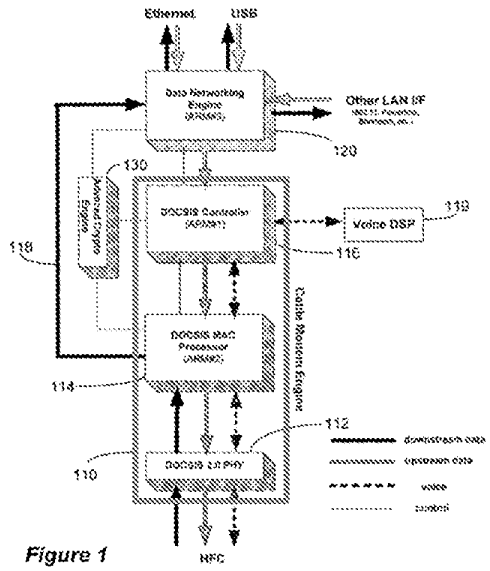


Figure 1

architecture. The architecture includes a cable modem engine having a DOCSIS PHY layer with a hardware transmitter and receiver, a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications, and a DOCSIS controller implementing VoIP functionality. The architecture also includes a data networking engine implementing all data networking processing and home networking applications. The data networking engine is completely decoupled from the cable modem engine. In one implementation, the VoIP functional-

'775 Patent, 2:6-15

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The first is the inclusion of a so-called cable modem engine.

And that cable modem engine is in turn made up of three discrete physical components.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Engine Architecture

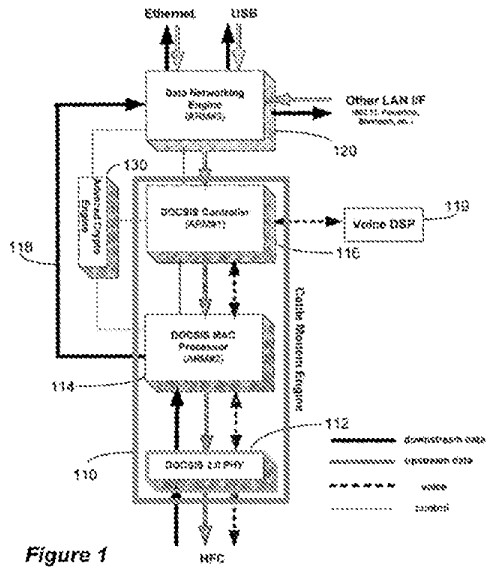


Figure 1

architecture. The architecture includes a cable modem engine having a DOCSIS PHY layer with a hardware transmitter and receiver, a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications, and a DOCSIS controller implementing VoIP functionality. The architecture also includes a

'775 Patent, 2:6-11

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The first is a so-called DOCSIS 2.0 P H Y labeled 112 in the figure.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Engine Architecture

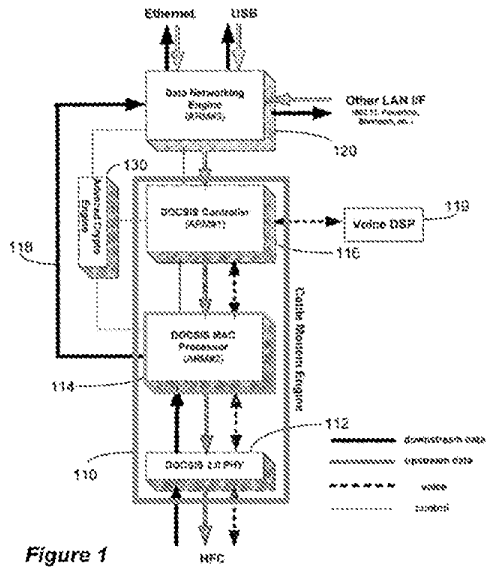


Figure 1

architecture. The architecture includes a cable modem engine having a DOCSIS PHY layer with a hardware transmitter and receiver, a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications, and a DOCSIS controller implementing VoIP functionality. The architecture also includes a

'775 Patent, 2:6-11

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The second is a so-called DOCSIS MAC processor labeled 114 in the figure.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Engine Architecture

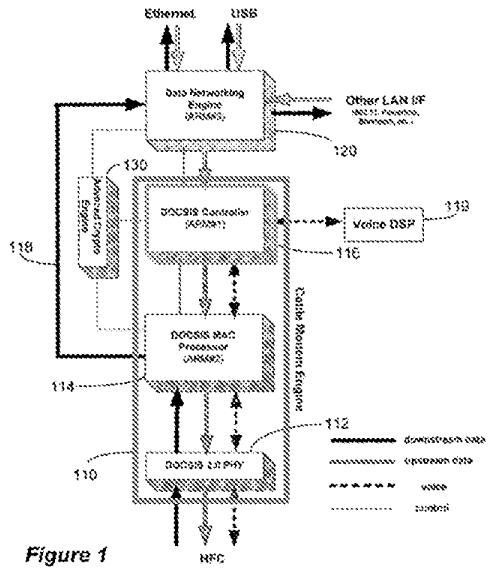


Figure 1

architecture. The architecture includes a cable modem engine having a DOCSIS PHY layer with a hardware transmitter and receiver, a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications, and a DOCSIS controller implementing VoIP functionality. The architecture also includes a

'775 Patent, 2:6-11

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And the third is a so-called DOCSIS Controller labeled 116 in the figure.

Now I'll discuss the disclosed functions of each of those three discrete physical components.

'775 PATENT: CABLE MODEM ARCHITECTURE

## DOCSIS 2.0 PHY

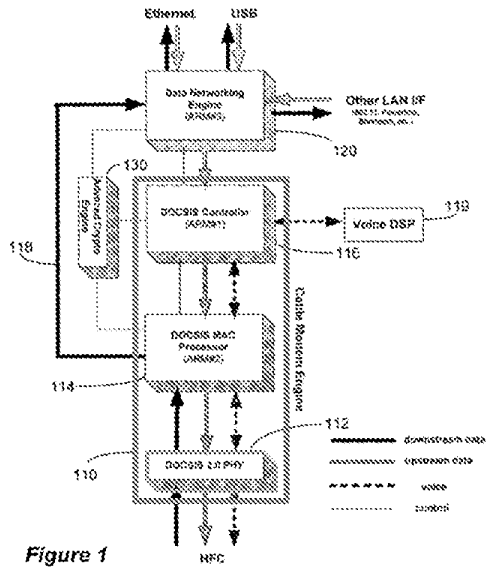


*Figure 1*

As seen in FIG. 1, DOCSIS PHY layer **112** receives downstream data, transmits upstream data and receives and transmits voice data from/to an external source. In one implementation, the external source is a HFC (hybrid fiber coax) cable employing both fiber optic and coaxial cable as an effective means for delivering combined data, video, voice, CATV and other communications.

'775 Patent, 2:61-67

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The DOCSIS 2.0 P H Y receives downstream voice and other data from the cable network and transmits voice and other data upstream to the cable network.

'775 PATENT: CABLE MODEM ARCHITECTURE

## DOCSIS MAC Processor

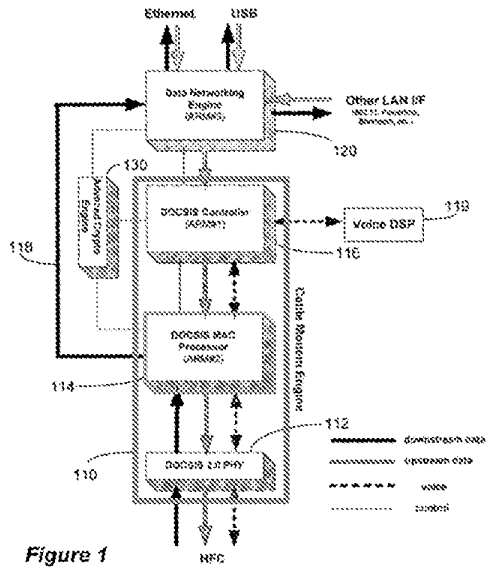


Figure 1

Processor **114** implements real-time critical MAC functions for both upstream (US) and downstream (DS) communications. These functions include US and DS synchronization, DS MAC address filtering, DS protocol filtering, US and DS PHS, concatenation, fragmentation, MAP processing, US transmission scheduling, as well as DOCSIS link-layer DES encryption and decryption. Processor 114 receives down-

'775 Patent, 3:1-7

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The DOCSIS MAC processor performs some of the DOCSIS MAC functionality of the cable modem.

MAC is an acronym that stands for medium access control. MAC functions relate to how the cable modem accesses the cable television network.

'775 PATENT: CABLE MODEM ARCHITECTURE

## DOCSIS Controller

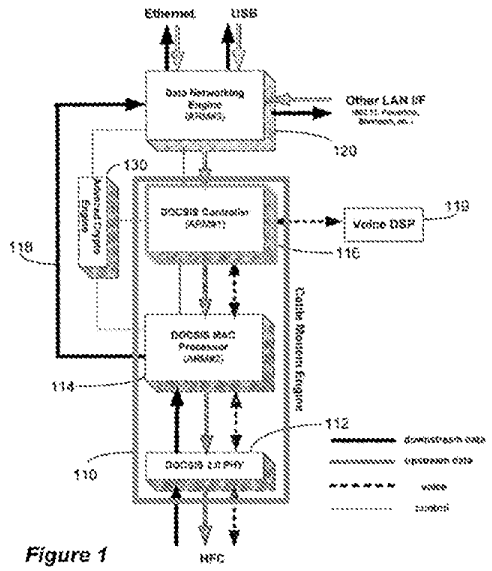


Figure 1

Controller **116** receives US PDU packets from data networking engine **120**. As previously described, DS PDU packets are forwarded by processor **114** to data networking engine **120** without involvement of controller **116**. In one implementation, controller **116** is an ARM940-based RISC processor. Controller **116** implements the following DOCSIS (blocks **200-212**) functions. MAC management message (MMM) processing (ranging, registration, UCD, UCC, DCC, DCI, UP-DIS, DSx and BPI+) (functional block **200** of FIG. **2**), IGMP, MAC address learning, classification, US protocol filtering (functional block **202** of FIG. **2**) and CM IP stack and software downloading. Functional block **204** carries out cable modem IP/UHP functions. functional block **206** carries out SNMP, DHCP, TFTP and TOD functionality and functional block **208** is responsible for cable modem provisioning. Controller **116** also includes a data network engine driver **210** in communication with data network engine **120** and cable MAC driver **212**.

In addition, in order to minimize the latency and jitter of voice packets, controller **116** also implements all PacketCable functionality. In FIG. **2**, PacketCable functionality is represented by functional blocks **220-228**. These PacketCable functions include provisioning (block **220**), security and signaling. Functional blocks **222** (voice DSP driver), **224** (streamlined IP/UDP/RTP with classification, PHS, IP/LLC filtering) and **226** (voice MAC driver) interface with external voice DSP **119**. Additionally MGCP and RTCP functions are provided by functional block **228**.

'775 Patent, 3:21-48

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Finally, there is the DOCSIS controller. According to the specification, the DOCSIS controller performs a large number of functions, as indicated by the specification excerpts we include on this slide.

'775 PATENT: CABLE MODEM ARCHITECTURE

## DOCSIS Controller

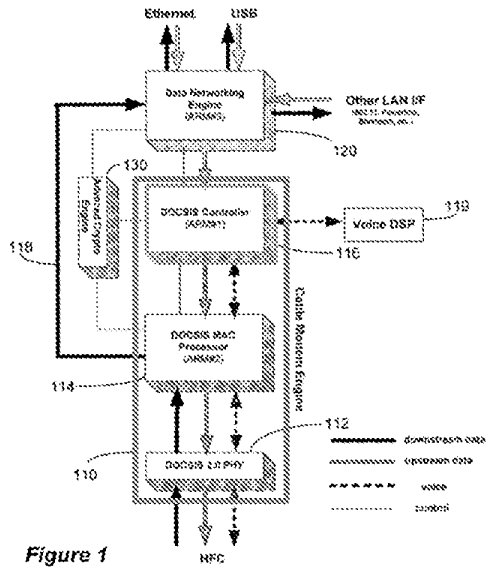


Figure 1

Controller **116** receives US PDU packets from data networking engine **120**. As previously described, DS PDU packets are forwarded by processor **114** to data networking engine **120** without involvement of controller **116**. In one implementation, controller **116** is an ARM940-based RISC processor. Controller **116** implements the following DOCSIS (blocks **200-212**) functions. MAC management message (MMM) processing (ranging, registration, UCD, UCC, DCC, DCI, UP-DIS, DSx and BPI+) (functional block **200** of FIG. **2**), IGMP, MAC address learning, classification, US protocol filtering (functional block **202** of FIG. **2**) and CM IP stack and software downloading. Functional block **204** carries out cable modem IP/UHP functions. functional block **206** carries out SNMP, DHCP, TFTP and TOD functionality and functional block **208** is responsible for cable modem provisioning. Controller **116** also includes a data network engine driver **210** in communication with data network engine **120** and cable MAC driver **212**.

In addition, in order to minimize the latency and jitter of voice packets, controller **116** also implements all PacketCable functionality. In FIG. **2**, PacketCable functionality is represented by functional blocks **220-228**. These PacketCable functions include provisioning (block **220**), security and signaling. Functional blocks **222** (voice DSP driver), **224** (streamlined IP/UDP/RTP with classification, PHS, IP/LLC filtering) and **226** (voice MAC driver) interface with external voice DSP **119**. Additionally MGCP and RTCP functions are provided by functional block **228**.

'775 Patent, 3:21-48

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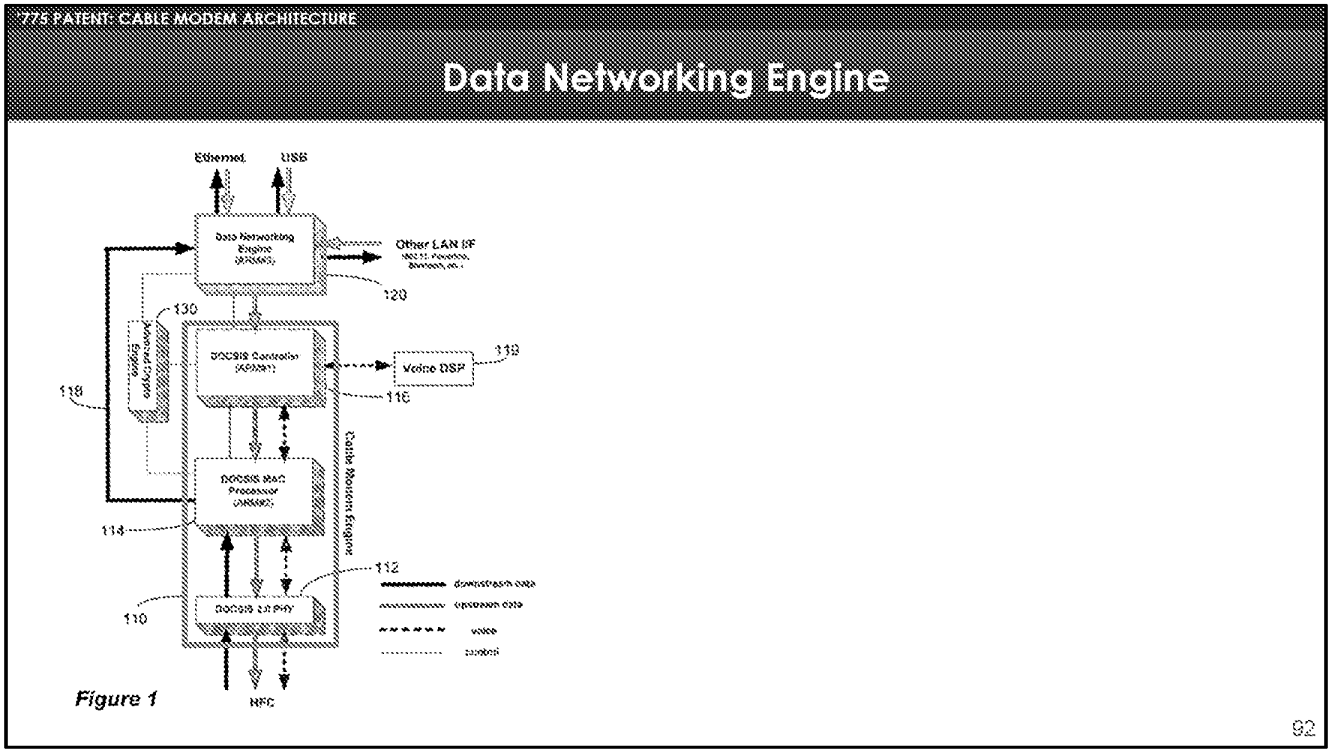
Among the functions performed by the DOCSIS Controller are a number of DOCSIS MAC functions. These include MAC management message processing, MAC address learning, and voice MAC driver functions.

So although the cable modem engine includes a so-called DOCSIS MAC processor, the DOCSIS MAC processor does not perform all of the DOCSIS MAC functions of the cable modem. The DOCSIS controller performs a number of DOCSIS MAC functions as well.




Now in addition to the cable modem engine, this cable modem architecture also includes a so-called data networking engine. We annotate that in green on this slide.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Data Networking Engine

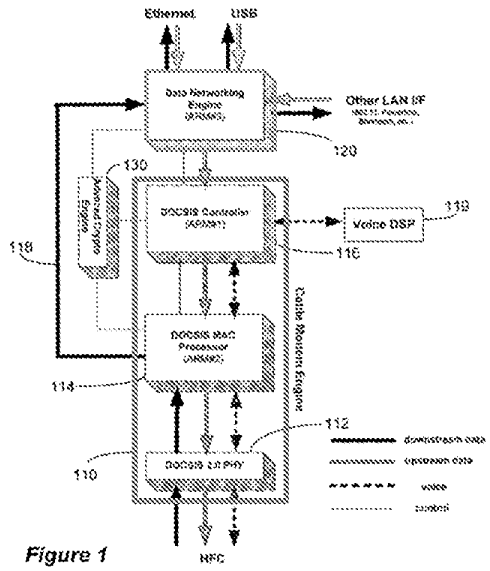


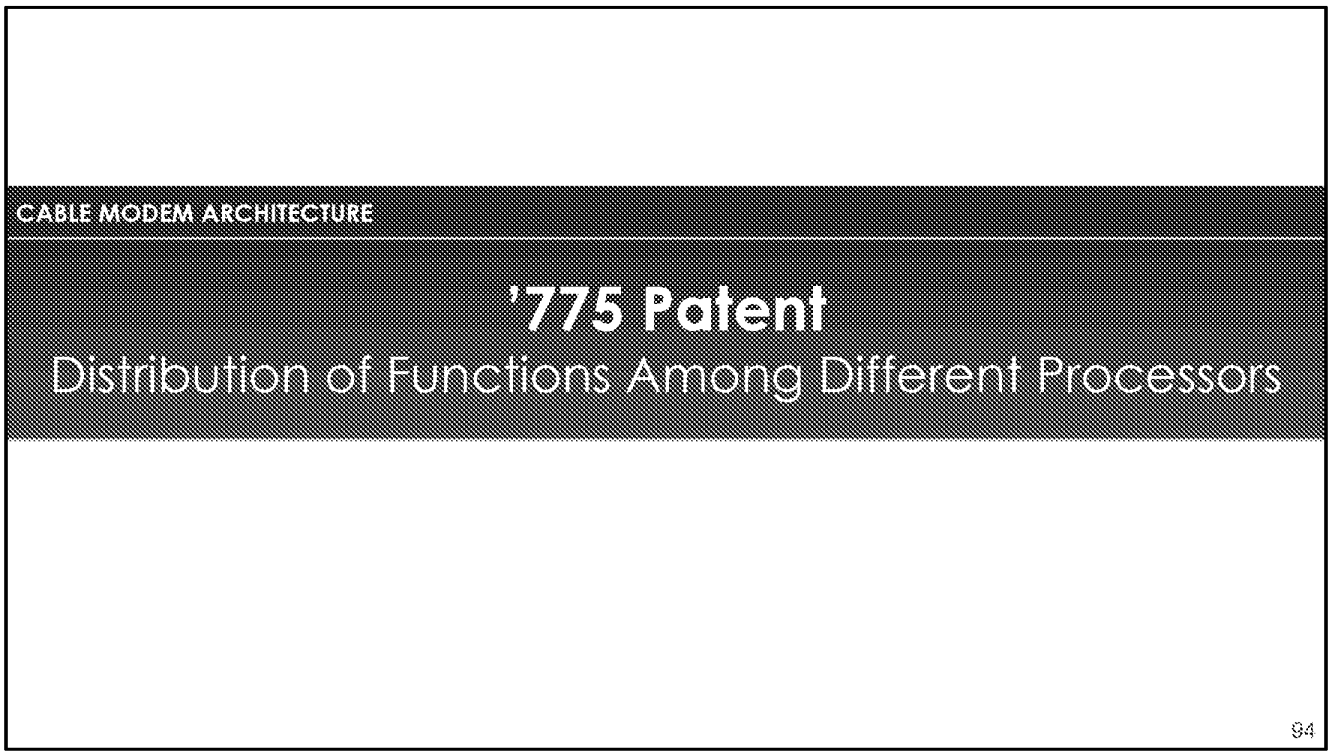

Figure 1

processing and home networking applications. The data networking engine is completely decoupled from the cable modem engine. In one implementation, the VoIP functional-

'775 Patent, 2:13-15

93

The data networking engine is said to be completely decoupled from the cable modem engine.




As I'll discuss now, an important aspect of the disclosed cable modem architecture is the distribution of functions among different processors within the cable modem.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Processors

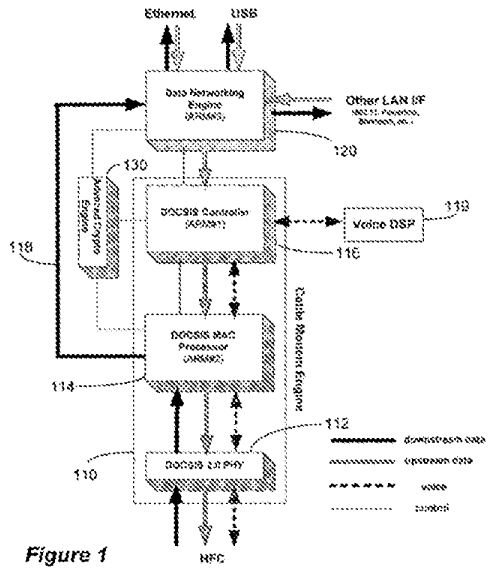



Figure 1

enhanced by the pipe-lining nature of system 100, the processing-intensive functions of the cable modem and data networking are rationally distributed among three different processors: DOCSIS MAC processor **114** (ARM #2); DOCSIS controller **116** (ARM #1); and data networking engine **120** (ARM #3), according to their orders in the packet flow. To

'775 Patent, 4:44-49

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As the specification explains, the objectives of the invention are achieved by distributing the functions of the cable modem among three different processors. Each of these processors is an ARM processor, which is one type of processor known in the art.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Processors

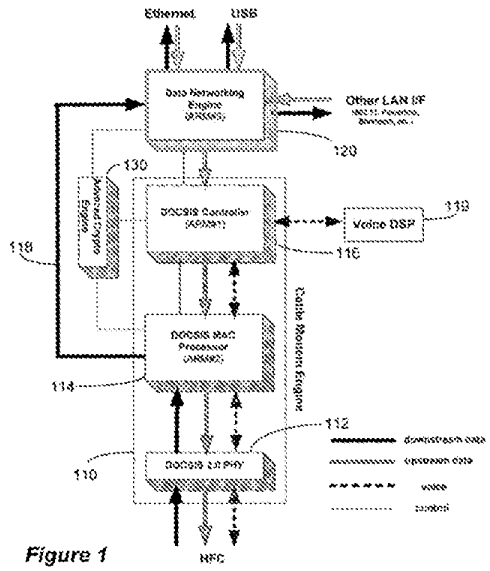


Figure 1

enhanced by the pipe-lining nature of system 100, the processing-intensive functions of the cable modem and data networking are rationally distributed among three different processors: DOCSIS MAC processor **114** (ARM #2); DOCSIS controller **116** (ARM #1); and data networking engine **120** (ARM #3), according to their orders in the packet flow. To

'775 Patent, 4:44-49

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The data networking engine is one of the 3 ARM processors.

In both figure 1 and in the specification, the data networking engine is identified as being ARM processor number 3.
The inventors designated this to be the third of the three ARM processors within cable modem 100.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Processors

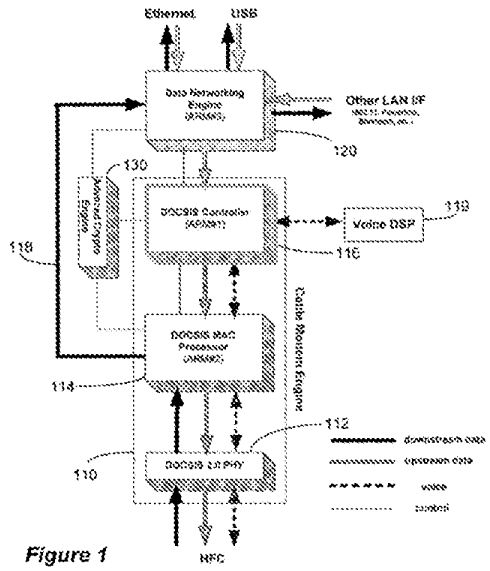


Figure 1

enhanced by the pipe-lining nature of system 100 the processing-intensive functions of the cable modem and data networking are rationally distributed among three different processors: DOCSIS MAC processor **114** (ARM #2); DOCSIS controller **116** (ARM #1); and data networking engine **120** (ARM #3), according to their orders in the packet flow. To

'775 Patent, 4:44-49

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The DOCSIS controller is another one of the three ARM processors within the cable modem. The inventors designated the DOCSIS controller as ARM processor number 1.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Cable Modem Processors

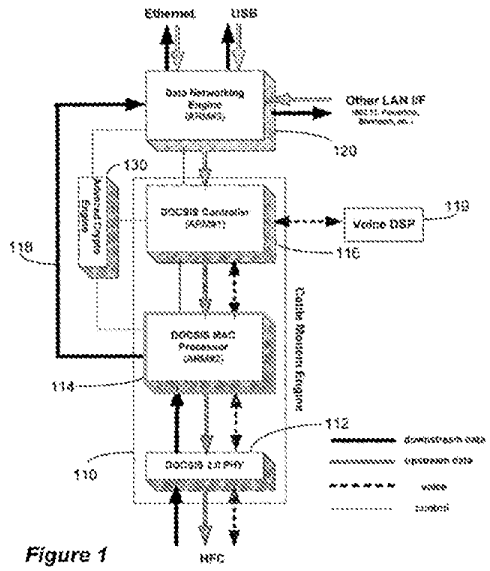


Figure 1

enhanced by the pipe-lining nature of system 100, the processing-intensive functions of the cable modem and data networking are rationally distributed among three different processors: DOCSIS MAC processor **114** (ARM #2); DOCSIS controller **116** (ARM #1); and data networking engine **120** (ARM #3), according to their orders in the packet flow. To

'775 Patent, 4:44-49

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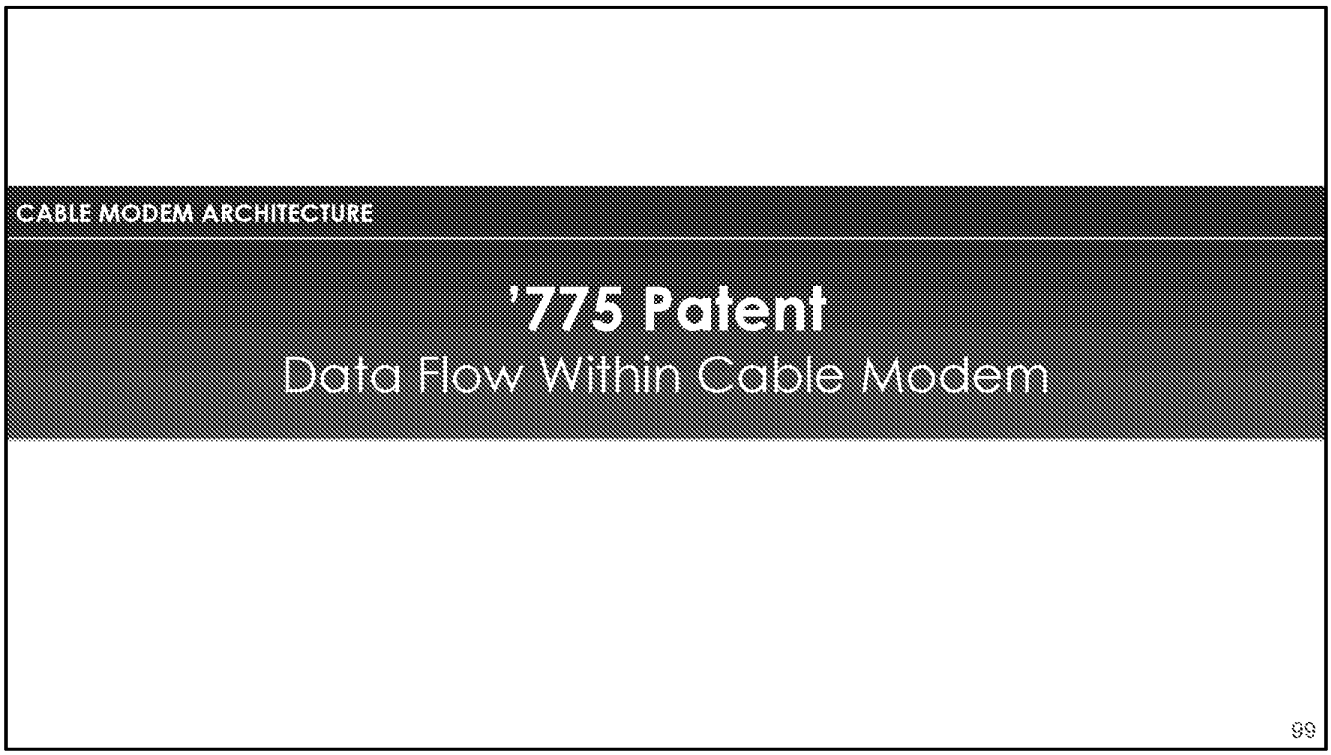
Finally, the DOCSIS MAC processor is the last disclosed ARM processor within cable modem 100. The inventors designated the DOCSIS MAC processor as ARM processor number 2.




Another important aspect of the disclosed cable modem architecture is the way data flows through the cable modem. We will discuss that now.

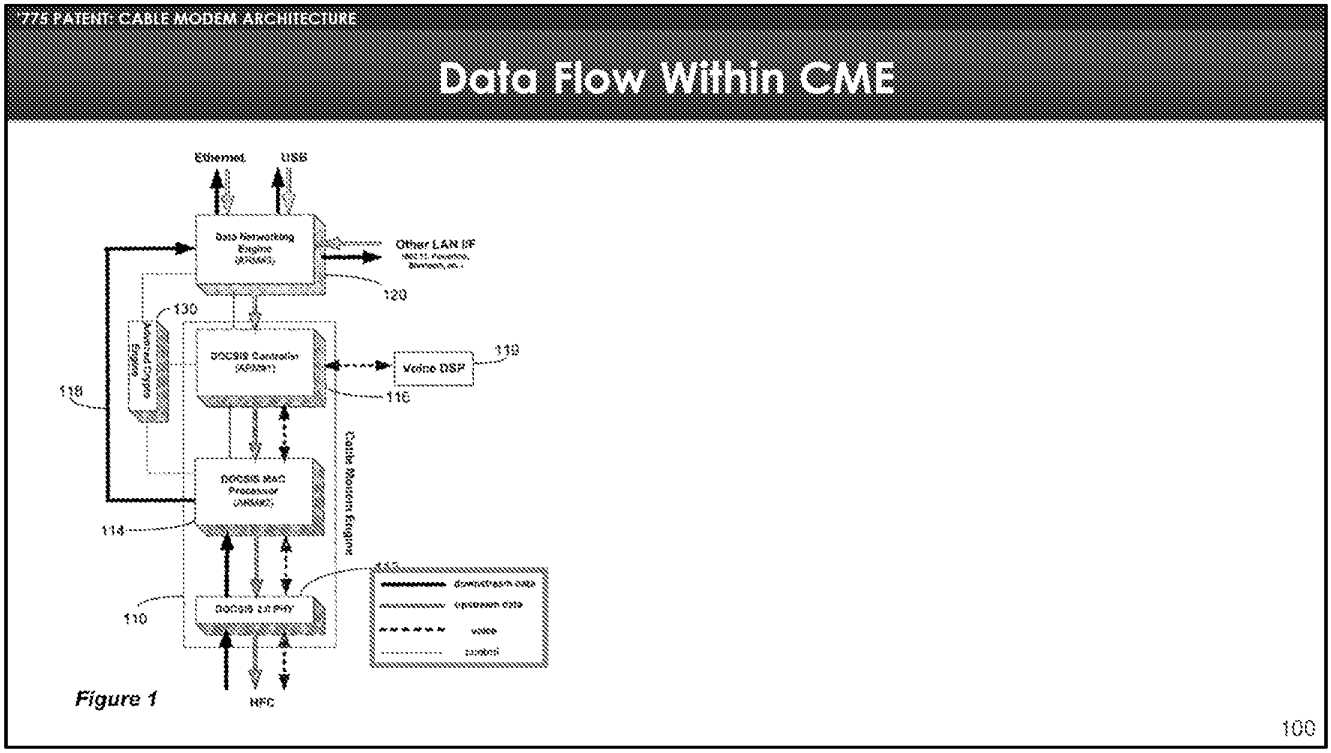
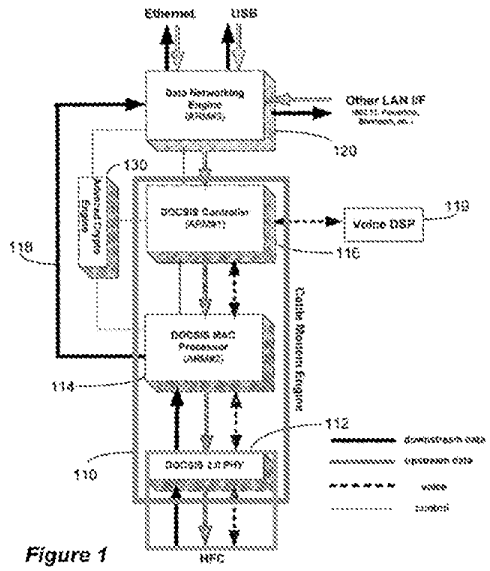



Figure 1 of the 775 patent includes a legend explaining how the different kinds of data that flow through cable modem 100 will be represented.

As indicated by the legend, voice is represented by a dashed line, upstream data by a thick grey line and downstream data by a thick black line.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Data Flow Within CME




As seen in FIG. 1, DOCSIS PHY layer 112 receives downstream data, transmits upstream data and receives and transmits voice data from/to an external source. In one implement-

'775 Patent, 2:61-63

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As we see in figure 1 then, in the portion we annotated in green, all upstream and downstream voice and other data goes through the DOCSIS 2.0 PHY.

The specification spells this out as well.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Data Flow Within Cable Modem

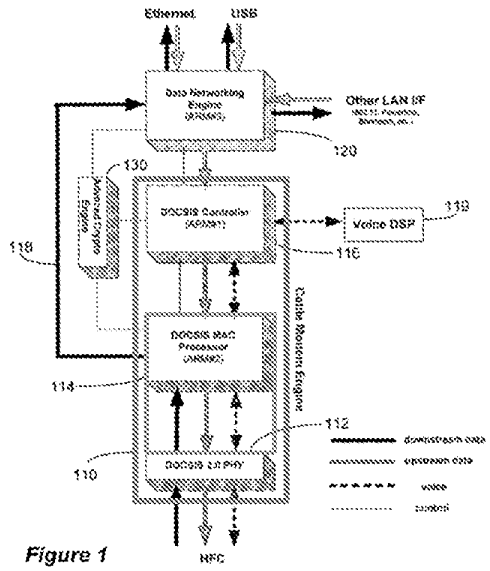


Figure 1

encryption and decryption. Processor **114** receives downstream data from, provides upstream data to and exchanges voice data in both directions with DOCSIS PHY **112**. It also

'775 Patent, 3:7-9

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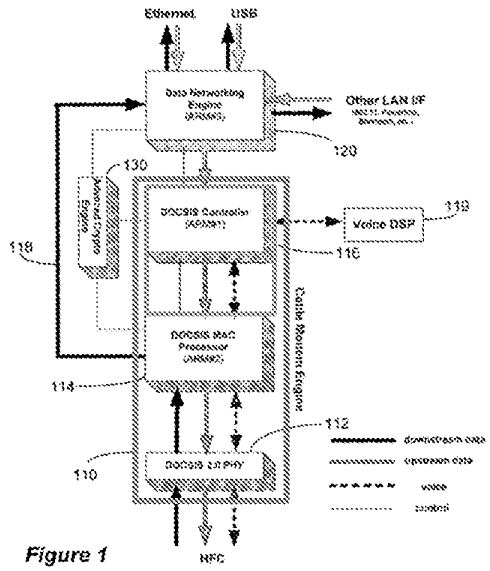
Similarly, all upstream and downstream voice and other data also goes through the DOCSIS MAC Processor.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Data Flow Within CME




voice data in both directions with DOCSIS PHY 112. It also receives upstream data from, and exchanges voice data in both directions with, controller **116**. To increase downstream

'775 Patent, 3:9-11

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Notice on this slide, however, that while all voice goes through the DOCSIS controller, only upstream data goes through the DOCSIS controller. Downstream data is not sent by the DOCSIS MAC Processor to the DOCSIS controller.

'775 PATENT: CABLE MODEM ARCHITECTURE

## Data Flow Within CME

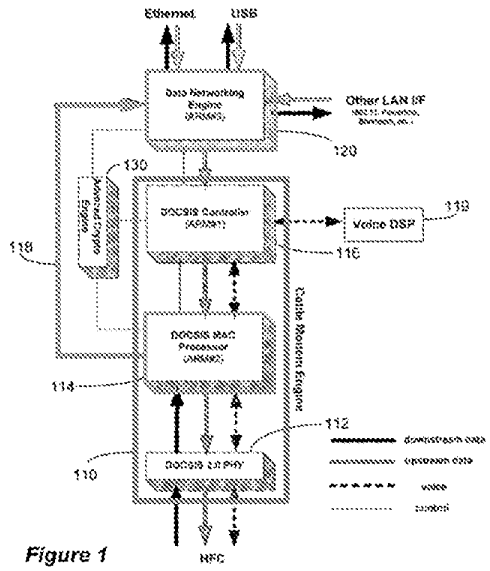


Figure 1

both directions with, controller 116. To increase downstream throughput, all processing of DS PDU (protocol data unit) packets is done within processor **114** without involving controller **116**. After being processed, DS PDU packets are forwarded by processor **116** directly to data networking engine **120** along path **118**, bypassing controller **116**. In one imple-

'775 Patent, 3:11-16

(ARM #3), according to their orders in the packet flow. To further boost downstream throughput, the downstream PDU packets are directly forwarded from the DOCSIS MAC processor **114** to the data networking engine **120** without going through DOCSIS controller **116**. This is made possible by exploiting the asymmetric nature of the DOCSIS US/DS **152** and **154**. In addition, the data path for voice packets is laid

'775 Patent, 4:49-55

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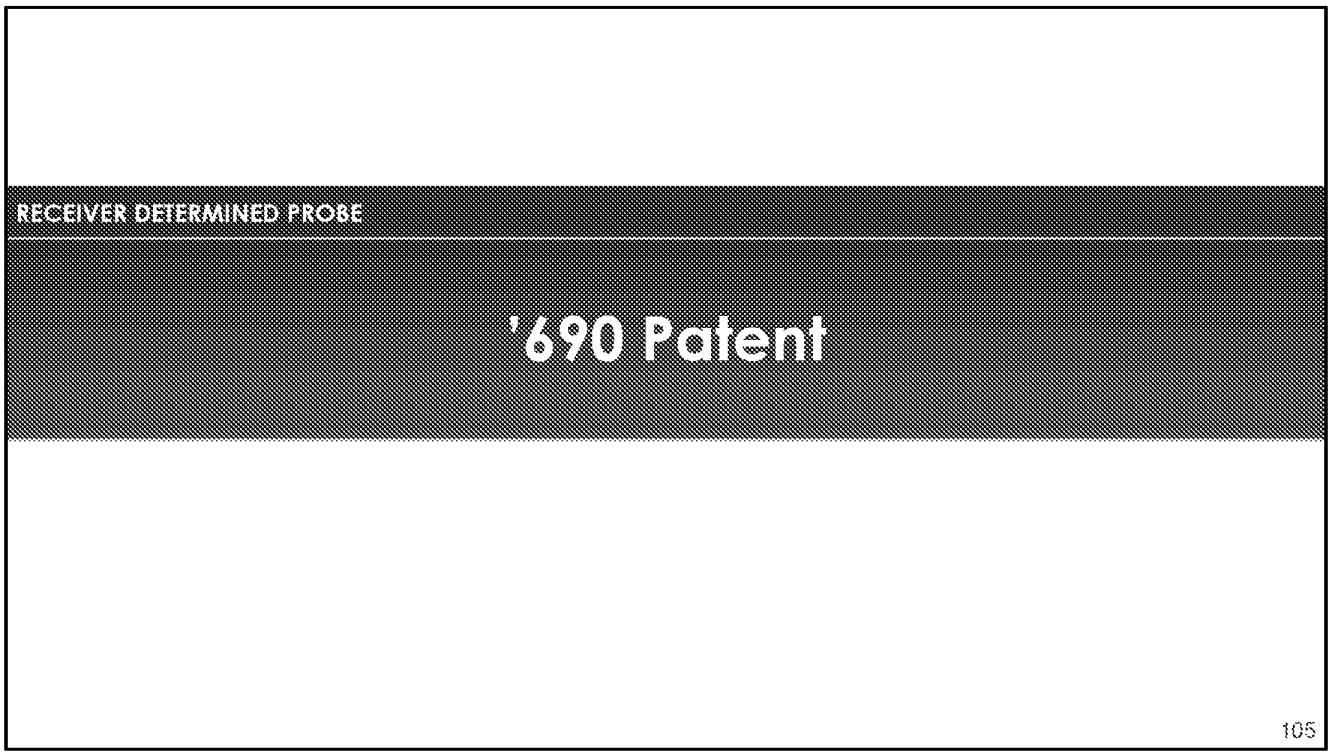
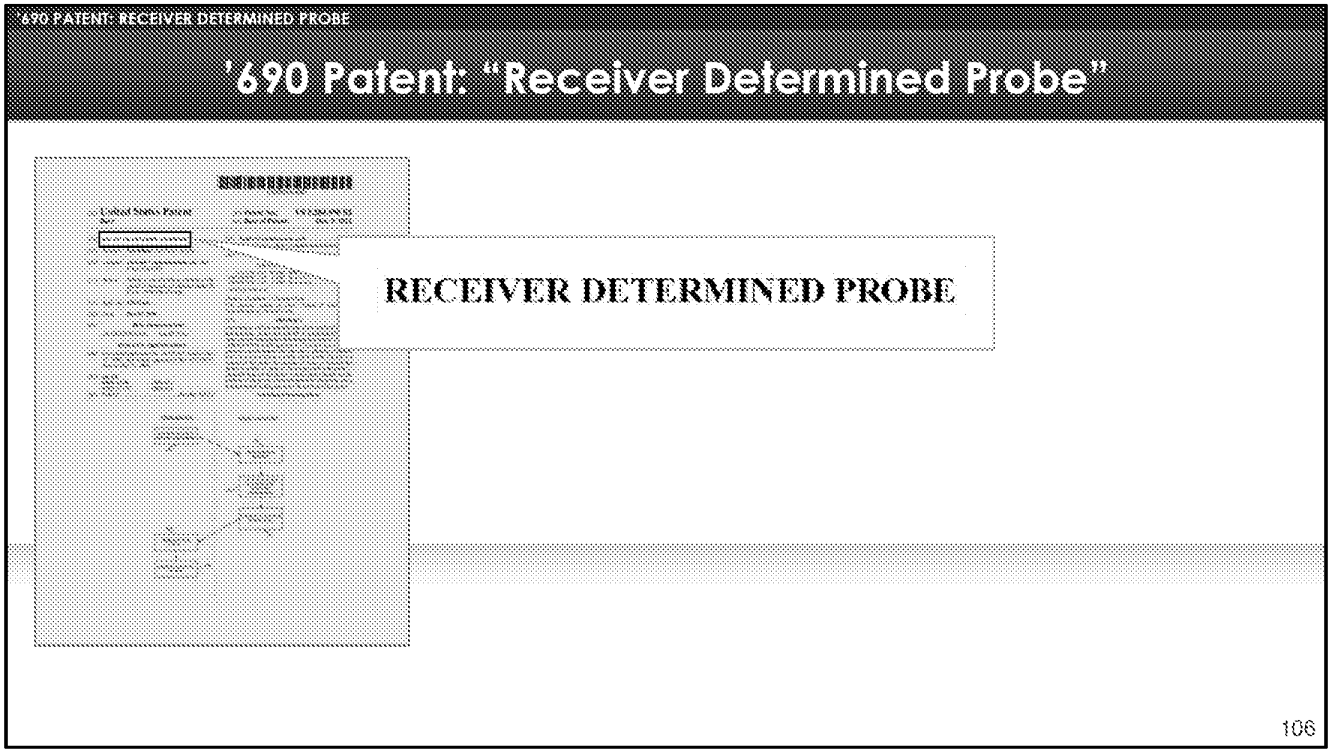
Instead, the DOCSIS MAC processor sends downstream data directly to the data networking engine, bypassing the DOCSIS controller completely.

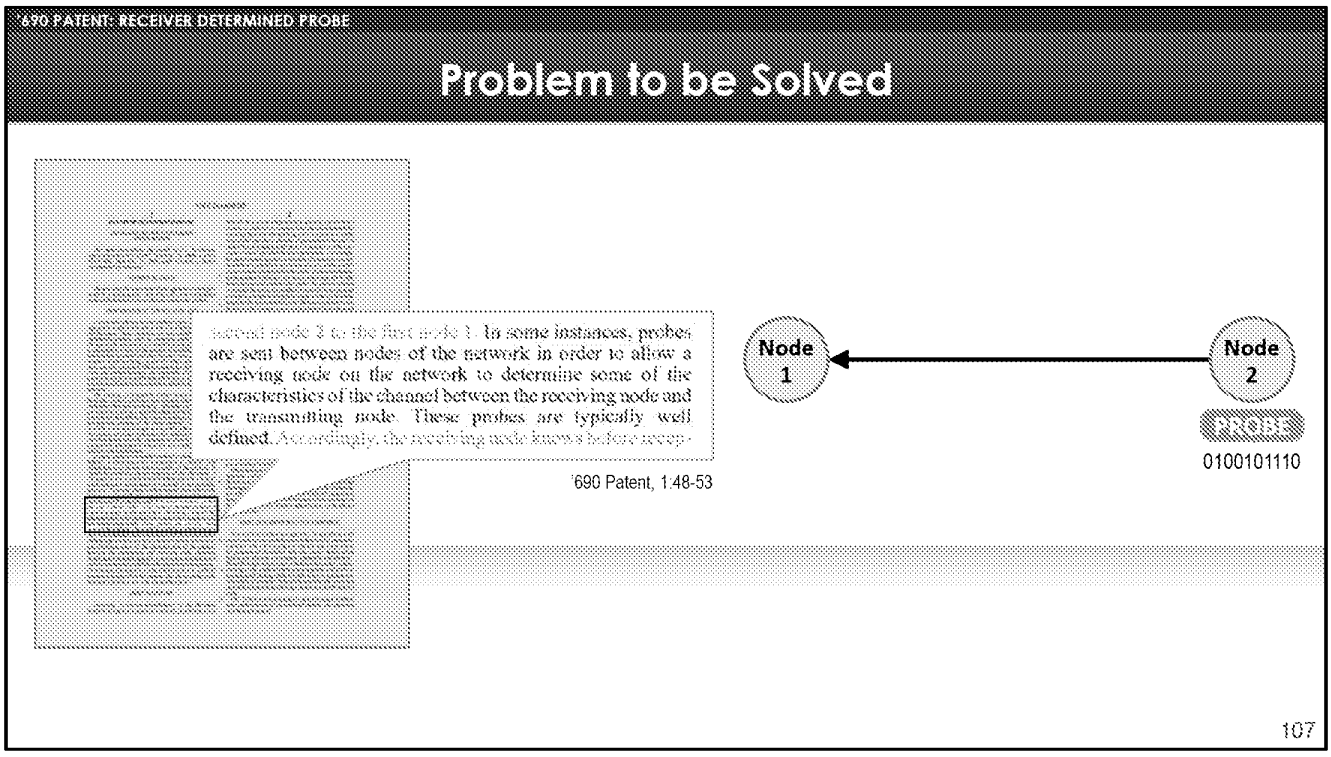
This ability to bypass the DOCSIS controller is described in the specification as being important to achieving the performance objectives of the cable modem architecture. That concludes our discussion of the 775 patent. We will not address the claims of the 775 patent because Charter contends those claims are indefinite, and that it is not possible to understand what those claims cover.




So now we'll turn now to the 690 patent.

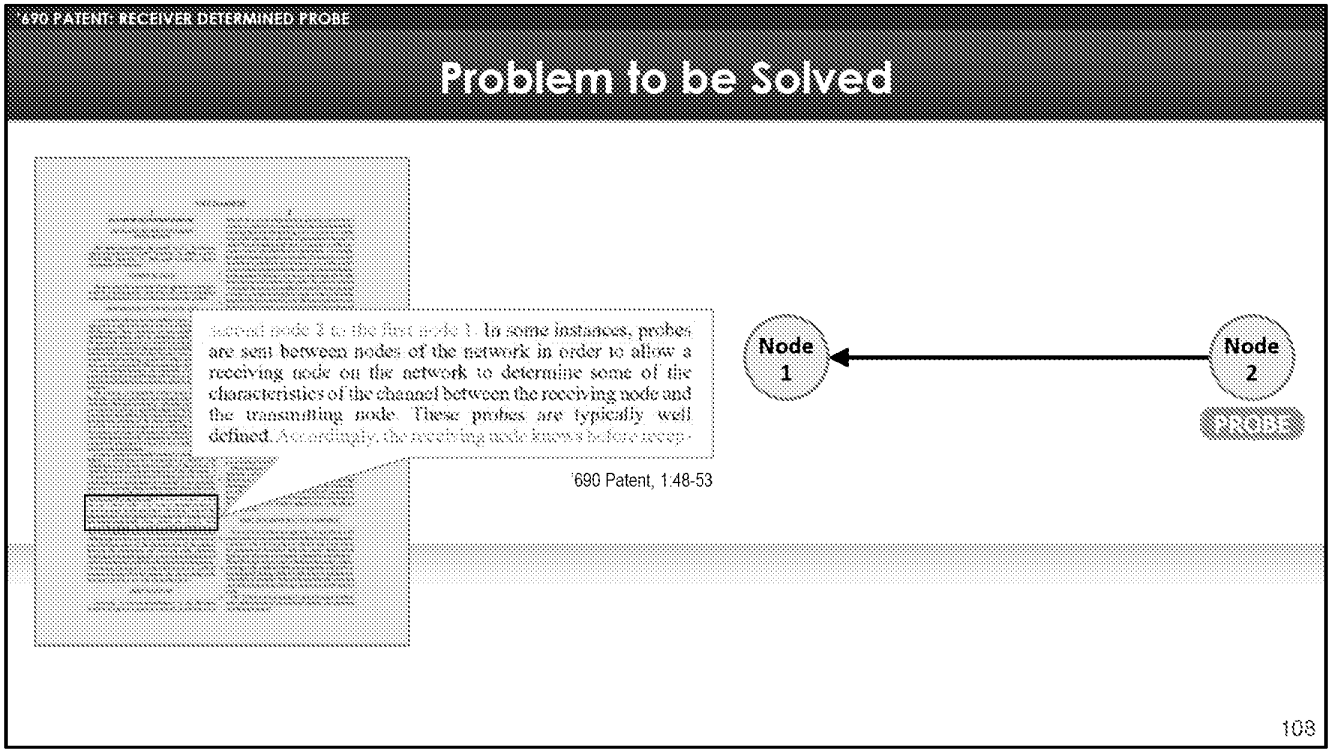



I mentioned earlier that the 690 patent is directed to a Receiver determined probe. Now I'll explain what that means.

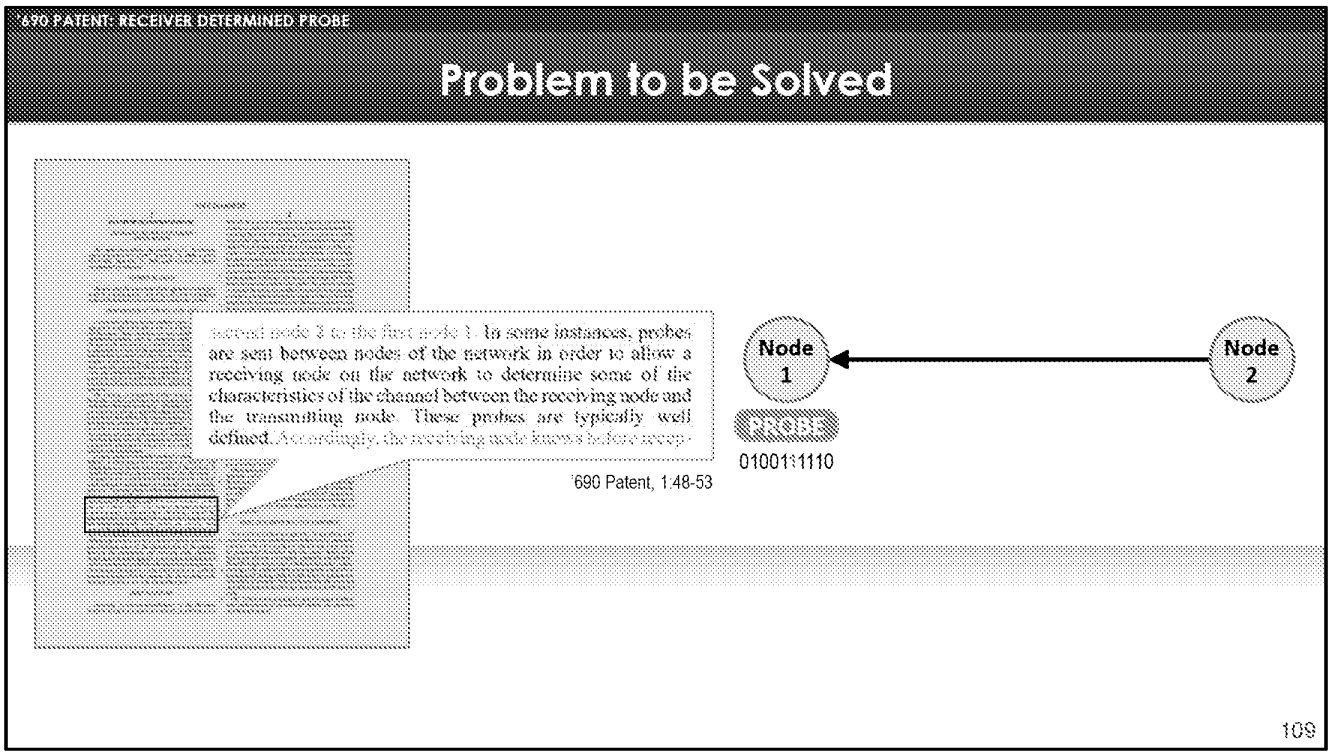



As the specification explains, it was known in the prior art for nodes on a network to send probes to one another. These probes included a known pattern which, at least according to the specification, were always defined in advance.

In the example we provide on this slide, the probe includes a predefined bit pattern of zeros and ones.

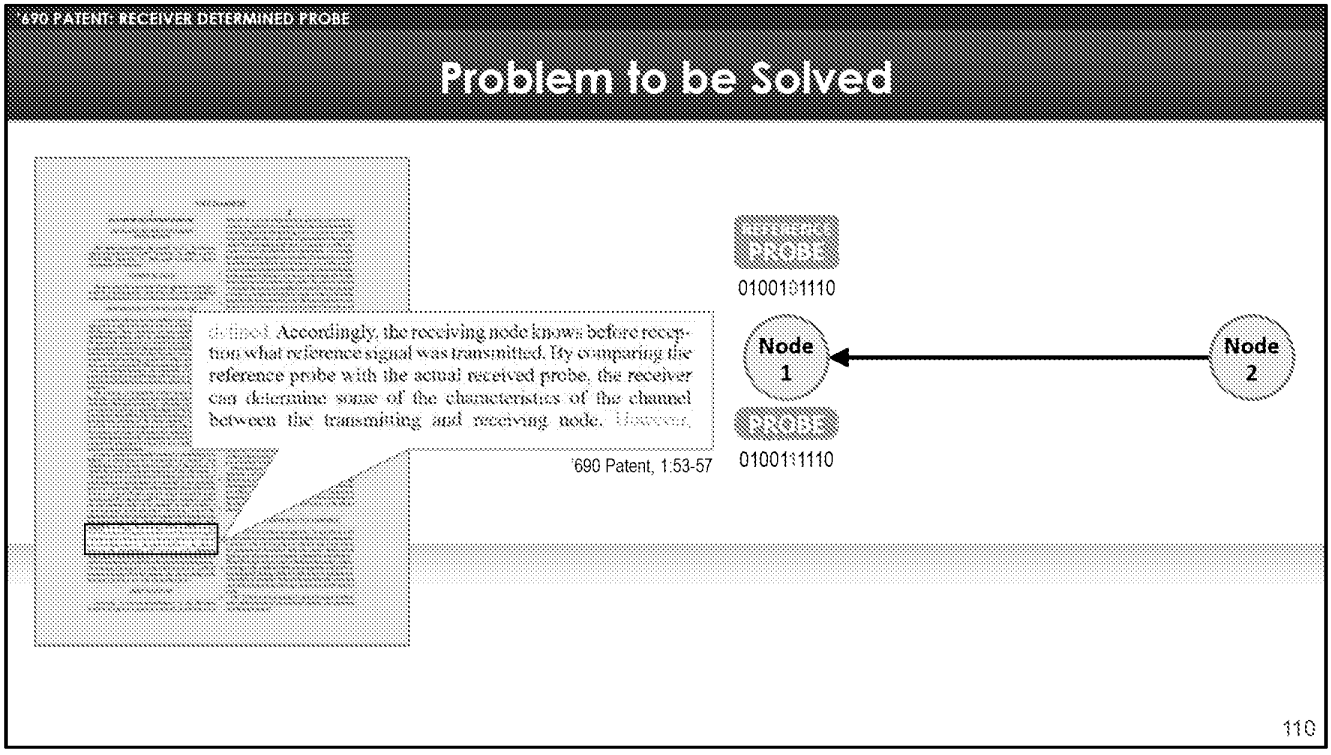



Here we show the probe being transmitted from node 2 to node 1.




Now during that transmission, problems with the communications channel can cause the probe to get corrupted.

In this example, the red probe bit highlighted in yellow was changed during transmission from a 0 to a 1.




Because the probes are defined in advance, however, the node that received the probe knows the pattern it was supposed to receive. It has a reference probe to compare to the probe it actually received.

As the specification explains, by examining the difference between the reference probe and the probe it actually received, the receiving node can determine characteristics of the channel over which the probe was transmitted.

**THE UNITED STATES DISTRICT COURT**
**FOR THE EASTERN DISTRICT OF TEXAS**
**MARSHALL DIVISION**

| | | |
|---|---|---|
| ENTROPIC COMMUNICATIONS, LLC, | § | |
| | § | |
| *Plaintiff,* | § | |
| | § | |
| v. | § | CASE NO. 2:22-CV-00125-JRG |
| | § | |
| CHARTER COMMUNICATIONS, INC., | § | |
| | § | |
| *Defendant.* | § | |
| | § | |
| | § | |

**CLAIM CONSTRUCTION**
**MEMORANDUM OPINION AND ORDER**

Before the Court is the Opening Claim Construction Brief (Dkt. No. 97) filed by Plaintiff Entropic Communications, LLC ("Plaintiff" or "Entropic"). Also before the Court are the Responsive Claim Construction Brief (Dkt. No. 104) filed by Defendant Charter Communications, Inc. ("Defendant" or "Charter") and Plaintiff's reply (Dkt. No. 110). The Court held a hearing on June 13, 2023.

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## I. BACKGROUND

Plaintiff alleges infringement of United States Patents No. 8,223,775 ("the '775 Patent"), 8,792,008 ("the '008 Patent"), 9,825,826 ("the '826 Patent"), 8,284,690 ("the '690 Patent"), 9,210,362 ("the '362 Patent"), and 10,135,682 ("the '682 Patent") (collectively, the "patents-in-suit"). (Dkt. 97, Exs. 1–6.)

## II. LEGAL PRINCIPLES

It is understood that "[a] claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using or selling the protected invention." *Burke, Inc. v. Bruno Indep. Living Aids, Inc.*, 183 F.3d 1334, 1340 (Fed. Cir. 1999). Claim construction is an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970–71 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).

"In some cases, however, the district court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period." *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015) (citation omitted). "In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the 'evidentiary underpinnings' of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal." *Id.* (citing 517 U.S. 370).

To ascertain the meaning of claims, courts look to three primary sources: the claims, the specification, and the prosecution history. *Markman*, 52 F.3d at 979. The specification must contain a written description of the invention that enables one of ordinary skill in the art to make and use the invention. *Id.* A patent's claims must be read in view of the specification, of which

they are a part. *Id.* For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claims. *Id.* "One purpose for examining the specification is to determine if the patentee has limited the scope of the claims." *Watts v. XL Sys., Inc.*, 232 F.3d 877, 882 (Fed. Cir. 2000).

Nonetheless, it is the function of the claims, not the specification, to set forth the limits of the patentee's invention. Otherwise, there would be no need for claims. *SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc). The patentee is free to be his own lexicographer, but any special definition given to a word must be clearly set forth in the specification. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388 (Fed. Cir. 1992). Although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader than the embodiments. *Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994).

This Court's claim construction analysis is substantially guided by the Federal Circuit's decision in *Phillips v. AWH Corporation*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In *Phillips*, the court set forth several guideposts that courts should follow when construing claims. In particular, the court reiterated that "the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Id.* at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To that end, the words used in a claim are generally given their ordinary and customary meaning. *Id.* The ordinary and customary meaning of a claim term "is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1313. This principle of patent law flows naturally from the recognition that

inventors are usually persons who are skilled in the field of the invention and that patents are addressed to, and intended to be read by, others skilled in the particular art. *Id.*

Despite the importance of claim terms, *Phillips* made clear that "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* Although the claims themselves may provide guidance as to the meaning of particular terms, those terms are part of "a fully integrated written instrument." *Id.* at 1315 (quoting *Markman*, 52 F.3d at 978). Thus, the *Phillips* court emphasized the specification as being the primary basis for construing the claims. *Id.* at 1314–17. As the Supreme Court stated long ago, "in case of doubt or ambiguity it is proper in all cases to refer back to the descriptive portions of the specification to aid in solving the doubt or in ascertaining the true intent and meaning of the language employed in the claims." *Bates v. Coe*, 98 U.S. 31, 38 (1878). In addressing the role of the specification, the *Phillips* court quoted with approval its earlier observations from *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998):

> Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.

*Phillips*, 415 F.3d at 1316. Consequently, *Phillips* emphasized the important role the specification plays in the claim construction process.

The prosecution history also continues to play an important role in claim interpretation. Like the specification, the prosecution history helps to demonstrate how the inventor and the United States Patent and Trademark Office ("PTO") understood the patent. *Id.* at 1317. Because the file history, however, "represents an ongoing negotiation between the PTO and the applicant,"

it may lack the clarity of the specification and thus be less useful in claim construction proceedings. *Id.* Nevertheless, the prosecution history is intrinsic evidence that is relevant to the determination of how the inventor understood the invention and whether the inventor limited the invention during prosecution by narrowing the scope of the claims. *Id.*; *see Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1350 (Fed. Cir. 2004) (noting that "a patentee's statements during prosecution, whether relied on by the examiner or not, are relevant to claim interpretation").

*Phillips* rejected any claim construction approach that sacrificed the intrinsic record in favor of extrinsic evidence, such as dictionary definitions or expert testimony. The *en banc* court condemned the suggestion made by *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002), that a court should discern the ordinary meaning of the claim terms (through dictionaries or otherwise) before resorting to the specification for certain limited purposes. *Phillips*, 415 F.3d at 1319–24. According to *Phillips*, reliance on dictionary definitions at the expense of the specification had the effect of "focus[ing] the inquiry on the abstract meaning of words rather than on the meaning of claim terms within the context of the patent." *Id.* at 1321. *Phillips* emphasized that the patent system is based on the proposition that the claims cover only the invented subject matter. *Id.*

*Phillips* does not preclude all uses of dictionaries in claim construction proceedings. Instead, the court assigned dictionaries a role subordinate to the intrinsic record. In doing so, the court emphasized that claim construction issues are not resolved by any magic formula. The court did not impose any particular sequence of steps for a court to follow when it considers disputed claim language. *Id.* at 1323–25. Rather, *Phillips* held that a court must attach the appropriate weight to the intrinsic sources offered in support of a proposed claim construction, bearing in mind the general rule that the claims measure the scope of the patent grant.

The Supreme Court of the United States has "read [35 U.S.C.] § 112, ¶ 2 to require that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910, 134 S. Ct. 2120, 2129 (2014). "A determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005) (citations and internal quotation marks omitted), *abrogated on other grounds by Nautilus*, 572 U.S. 898. "Indefiniteness must be proven by clear and convincing evidence." *Sonix Tech. Co. v. Publ'ns Int'l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017).

## III. AGREED TERMS

In their April 4, 2023 P.R. 4-3 Joint Claim Construction and Prehearing Statement, the parties submitted the following agreed-upon constructions (Dkt. No. 84, at 1):

| Term | Construction |
|---|---|
| "the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine"<br>('775 Patent, Claim 18) | Plain and ordinary meaning |
| "downstream PDU packets"<br>('775 Patent, Claim 18) | Plain and ordinary meaning |
| "parameters"<br>('690 Patent, Claims 1, 9) | Plain and ordinary meaning |
| "associated with [the] generation and transmission of [a/the] probe"<br>('690 Patent, Claim 1) | Plain and ordinary meaning |
| "wideband analog-to-digital converter (ADC) module" | Plain and ordinary meaning |

| | |
|---|---|
| ('362 Patent, Claim 1) | |

## IV. DISPUTED TERMS IN U.S. PATENT NO. 8,223,775

The '775 Patent, titled "Architecture for a Flexible and High-Performance Gateway Cable Modem," issued on July 17, 2012, and bears a filing date of September 30, 2003. The Abstract of the '775 Patent states:

> A cable modem system and architecture. A cable modem engine performs all cable modem functions, and a data networking engine performs all data and home networking functions. The cable modem engine is completely partitioned from the data networking engine. DOCSIS and VoIP functionality is implemented in the cable modem engine. The VoIP functionality may be in accordance with the Packet-Cable specification. The data networking functionality provided by the data networking engine may be in accordance with the CableHome specification.

**1. "a data networking engine implemented in a first circuit that includes at least one processor . . ." and "a cable modem engine implemented in a second circuit that includes at least one processor . . ."**

| **"a data networking engine implemented in a first circuit that includes at least one processor . . ."** ('775 Patent, Claim 18) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning. No construction necessary. | Indefinite |
| **"a cable modem engine implemented in a second circuit that includes at least one processor . . ."** ('775 Patent, Claim 18) | |
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning. No construction necessary. | Indefinite |

(Dkt. No. 84, at A-1; Dkt. No. 97, at 6; Dkt. No. 104, at 4; Dkt. No. 115, Ex. A, at 1.)

(a) The Parties' Positions

Plaintiff argues that "data networking" and "cable modem" were well-known phrases at the time of the invention and that the generic word "engine," as modified by the phrases "data networking" and "cable modem," would have been readily understood by a person of ordinary skill in this art. (Dkt. No. 97, at 6–7.) Plaintiff also argues that Defendant's indefiniteness arguments should be rejected because "electrical engineers routinely design subcomponents of consumer electronics, even if the components reside on the same chip," and "[a] POSITA would have no trouble determining where one circuit begins and another ends, because integrating functional blocks on 'a chip' does not render them indistinguishable." (*Id.*, at 8.)

Defendant responds that "[t]here is no disclosure of a DNE or CME implemented in any circuit, much less two circuits which are 'separate' from one another." (Dkt. No. 104, at 5.) Defendant argues that Plaintiff cannot simply chose whatever meaning or "level" of the word "circuit" suits its infringement contentions. (*See id.*, at 6–8.)

Plaintiff replies that the term "circuit" is readily understandable and that the specification discloses separation of functions. (Dkt. No. 110, at 1.)

At the June 13, 2023 hearing, Plaintiff argued that although the functionality of the first circuit and the second circuit must be separate, this does not necessarily require physical separation. Defendant responded that it is *not* arguing that the first circuit and the second circuit must be on separate *chips*, but the problem, Defendant argued, is that this claim uses "circuit" in a subjective way and, as a result, there is no way for a person of skill in the art to know if these limitations are satisfied.

(b) Analysis

Claim 18 of the '775 Patent recites (emphasis added):

> 18. A cable modem system comprising:
>
> *a data networking engine implemented in a first circuit that includes at least one processor*, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;
>
> *a cable modem engine implemented in a second circuit that includes at least one processor*, the second circuit being *separate* from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, the cable modem engine including a DOCSIS controller and a DOCSIS MAC processor, the DOCSIS MAC processor configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput; and
>
> a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

The specification discloses "functional partitioning" and also contrasts the disclosed cable modem system with "current stand-alone cable modem chips":

> Functional Partitioning. Cable modem 100 completely partitions data networking functions . . . from DOCSIS cable modem functionality.
>
> * * *
>
> A chip implementing cable modem system 100 will have only a small incremental hardware cost/functional increase over current stand-alone cable modem chips.

'775 Patent at 4:13–16 & 4:58–60; *see id.* at FIGS. 1 and 2 (illustrating data networking engine ("DNE") 120 and cable modem engine ("CME") 110).

Such disclosure regarding "functionality" is consistent with the technical dictionary cited by Defendant's expert, which defines "circuit" as:

> 1. Any path that can carry electrical current. 2. A combination of electrical components interconnected to perform a particular task. At one level, a computer

> consists of a single circuit; at another, it consists of hundreds of interconnected circuits.

(Dkt. No. 97, Ex. 8, Apr. 4, 2023 Almeroth Decl., App'x C, *Microsoft Computer Dictionary* 99 (5th ed. 2002).)

The specification and this extrinsic evidence are thus consistent with Plaintiff's interpretation that the phrases "first circuit" and "second circuit" are not limited to specific established structures but rather refer to interconnected electrical components that implement the data networking engine functionality and the cable modem engine functionality. *Cf. Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1320 (Fed. Cir. 2004) ("when the structure-connoting term 'circuit' is coupled with a description of the circuit's operation, sufficient structural meaning generally will be conveyed to [POSITAs]").

Further, although the claim requires "the second circuit being separate from the first circuit," the "first circuit" and "second circuit" need not be physically separated, such as on separate chips, for example. *Cf. Linear Tech. Corp. v. Int'l Trade Comm'n*, 566 F.3d 1049, 1055 (Fed. Cir. 2009) ("We agree with the Commission's construction of 'second circuit' and 'third circuit,' defining the terms broadly to not require entirely separate and distinct circuits."). This is true even if the disclosed cable modem system 100 is implemented as a "System-on-a-Chip" ("SoC") because even if the SoC is considered to be a single "circuit" (*see* Dkt. No. 97, at 8; *see also* Dkt. No. 104, Ex. 2, May 4, 2023 Kramer dep. at 127:13–22 ("a System on a Chip can be considered an integrated circuit")), this circuit can itself be understood as being composed of multiple circuits. The opinions of Defendant's expert to the contrary are unpersuasive. (*See* Dkt. No. 97, Ex. 8, Apr. 4, 2023 Almeroth Decl. at ¶¶ 64–68.)

Thus, Defendant does not meet its burden to show any lack of reasonable certainty. *Nautilus*, 572 U.S. at 910. The *Dow* and *Teva* cases cited by Defendant do not compel otherwise

because, for example, the present case does not involve different potential methods of measurement. *See Dow Chemical Co. v. Nova Chemicals Corp. (Canada)*, 803 F.3d 620, 631, 634 (Fed. Cir. 2015) (finding indefiniteness as to "a slope of strain hardening coefficient greater than or equal to 1.3"); *see also Teva Pharmaceuticals USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1338, 1344–45 (Fed. Cir. 2015) (finding indefiniteness as to "a molecular weight of about 5 to 9 kilodaltons").

The Court therefore hereby expressly rejects Defendant's indefiniteness argument. Defendant presents no alternative proposed constructions, and no further construction is necessary.

The Court accordingly hereby construes **"a data networking engine implemented in a first circuit that includes at least one processor . . ."** and **"a cable modem engine implemented in a second circuit that includes at least one processor . . ."** to have their **plain meaning**.

**2. "data bus"**

| **"data bus"** ('775 Patent, Claim 18) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | Indefinite |

(Dkt. No. 84, at A-2; Dkt. No. 97, at 9; Dkt. No. 104, at 8; Dkt. No. 115, Ex. A, at 2.)

(a) The Parties' Positions

Plaintiff argues that the meaning of "data bus" is well known to persons of ordinary skill in the art. (Dkt. No. 97, at 9.)

Defendant responds that, in light of the prosecution history, "the 'data bus' limitation is irreconcilable with the 'completely partitioned' limitation, and claim 18 is therefore indefinite." (Dkt. No. 104, at 8 (citation omitted).)

Plaintiff replies that Defendant's argument is untenable because "[p]rosecution history disclaimers operate to narrow what would otherwise fall within a claim; they do not operate to invalidate claims by eliminating elements textually present." (Dkt. No. 110, at 2.)

At the June 13, 2023 hearing, the parties argued this term together with the above-discussed ". . . in a first circuit . . ." and ". . . in a second circuit . . ." terms.

(b) Analysis

Defendant does not dispute that "data bus" is a well-known term in the relevant art. (*See* Dkt. No. 97, Ex. 10, *The IEEE Standard Dictionary of Electrical and Electronics Terms* 252 (defining "data bus" as "a bus used to communicate data to and from a processing unit or a storage device").)

The parties' dispute pertains not to the term "data bus" in isolation but rather to the accompanying "wherein" clause, which the parties present as a distinct disputed term and which is addressed separately below.

The Court therefore hereby construes **"data bus"** to have its **plain meaning**.

**3. "wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine"**

| **"wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine"** ('775 Patent, Claim 18) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | The cable modem engine and the data networking engine do not share any connecting circuitry, data paths, or memory devices. |

(Dkt. No. 84, at A-4; Dkt. No. 97, at 10; Dkt. No. 104, at 8; Dkt. No. 115, Ex. A, at 2–3.)

(a) The Parties' Positions

Plaintiff argues:

> The disputed claim language explicitly recites that the functions of the DNE [(data networking engine)] and CME [(cable modem engine)] are partitioned. This distinction is key because functions can be partitioned in hardware, software, or both. Functional partitioning is explicitly described in the specification as 'localizing' the cable modem and data networking functions in the separate engines:
>
> * * *
>
> A POSITA would understand that connecting the DNE and CME (e.g., via a data bus) does not eliminate the compartmentalization of their respective functions."

(Dkt. No. 97, at 10 (citations omitted).)

Defendant responds as to this term together with the term "data bus," which is addressed above. (*See* Dkt. No. 104, at 8.) Plaintiff replies likewise. (*See* Dkt. No. 110, at 2–3.)

At the June 13, 2023 hearing, the parties argued this term together with the above-discussed ". . . in a first circuit . . ." and ". . . in a second circuit . . ." terms.

(b) Analysis

Claim 18 of the '775 Patent recites (emphasis added):

> 18. A cable modem system comprising:
>
> a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;
>
> a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, the cable modem engine including a DOCSIS controller and a DOCSIS MAC processor, the DOCSIS MAC processor configured to process downstream PDU packets and *forward the processed packets directly to the data networking engine* without the involvement of the DOCSIS controller in order to boost downstream throughput; and

> a *data bus* that connects the data networking engine to the cable modem engine, *wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine*.

The specification discloses "localizing" the *functions*:

> Functional Partitioning. Cable modem 100 completely partitions data networking *functions* (advanced bridging/routing, NAT/firewall, VPN, web server and CableHome applications) from DOCSIS cable modem *functionality*. This is accomplished by localizing data networking *functions* in the data networking engine processor and localizing cable modem *functions* in the cable modem engine processor.

'775 Patent at 4:13–19 (emphasis added). Further, the claim itself recites that the cable modem engine "forward[s] the processed packets directly to the data networking engine," thus implying that such communication is not inconsistent with the cable modem engine and the data networking engine being "completely partitioned" from one another. *See id.* at Figs. 1 & 2 (illustrating data path 118 between CME and DNE); *see also id.* at 3:15–17 ("DS PDU packets are forwarded by [the DOCSIS MAC processor] directly to [DNE] 120 along path 118, bypassing controller 116").

The prosecution history cited by Defendant does not compel otherwise. The patentee distinguished the "Brooks" reference (United States Patent Application Publication No. 2001/0039600) as follows:

> [T]he Office Action make the conclusion statement [*sic*] that "the data networking engine and cable modem engines are represented in Figures 1 and 2 of the [Brooks] reference" . . . . However, Applicant is uncertain how any reasonable interpretation of these Figures can provide correspondence. For example, Figure 2 of [Brooks] discloses only two processors, each of which, therefore, must correspond to the claimed data-networking and cable-modem engines. However, the discussion of Figure 2 makes clear that the cable modem functions are performed by CMAC unit 224 . . . . Therefore, in order for the cable modem engine to contain a processor and perform the CMAC functions as claimed, the cited cable modem engine must include circuitry to connect the processors with the CMAC unit. Because available *connecting circuitry would be shared with the other processor*, Applicant is uncertain how the asserted cable modem engine and home networking engine can be completely partitioned as claimed.

(Dkt. No. 97, Ex. 8, Apr. 4, 2023 Almeroth Decl., App'x G, Apr. 5, 2010 Response to Final Office Action, at 6 (ENTROPIC_CHARTER_0000108) (p. 236 of 290 of Ex. 8) (emphasis added).)

After an advisory action by the examiner, the patentee explained further, distinguishing Brooks as using processors that were not functionally separate:

> The Examiner's apparent designation of the first processor 102 in Brooks '600 as the "data networking engine," and the second processor 104 and the CMAC/CPHY block (114, 118, 224 and 228) as the "cable modem engine," further does not square with the claim 1 feature that "the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine," and the claim 15 feature of "partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VOOP functionality." This is because the CMAC/CPHY block (114, 118, 224 and 228) communicates with both the processors 102 and 104 by sharing the same data paths and sharing the same direct memory access controller. (See peripheral bus 112 – bridge 110 – system bus 108 in Fig. 1 and APB 214 – OMA Controller/ASB-APB Bridge 212 – ASB 210 in Fig. 2, and paragraphs 0034 and 0035).
>
> Further, accepting the Examiner's assertion that first processor 102 handles data networking *functionality*, and considering the description of paragraphs 0025 and 0026 that processor 102 is programmed to implement the desired MAC *functionality* (which would include typical DOCSIS MAC *functionality*), leads to a conclusion that the Brooks '600 processor 102 does not implement a complete partitioning or a completely decoupled arrangement of the data networking engine from the cable modem engine.
>
> Thus, Brooks '600 does not provide the complete partitioning or completely decoupled arrangement of the data networking engine from the cable modem engine that the Examiner apparently asserts it does.

(*Id.*, June 7, 2010 Response to Final Office Action, at 9 (ENTROPIC_CHARTER_0000134) (p. 254 of 290 of Ex. 8) (emphasis added); *see id.*, at 7–9 (ENTROPIC_CHARTER_0000132–34) (pp. 252–54 of 290 of Ex. 8).)

The patentee thus distinguished Brooks as lacking *functional* separation because what the examiner identified as the cable modem engine in Brooks required interaction with the "CMAC unit," and, the patentee argued, such interaction involved circuitry that was shared with what the

examiner identified as the data networking engine in Brooks. (*See id.*) Thus, no relevant disclaimer is apparent, and in particular the patentee did not disclaim having a data bus that connects the data networking engine to the cable modem engine, as recited in above-reproduced Claim 1 of the '775 Patent. *See Omega Eng'g Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) ("prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on *definitive* statements made during prosecution") (emphasis added); *see also id.* at 1325–26 ("for prosecution disclaimer to attach, our precedent requires that the alleged disavowing actions or statements made during prosecution be both *clear and unmistakable*") (emphasis added).

The Court therefore hereby expressly rejects Defendant's proposal that the cable modem engine and the data networking engine cannot share any connecting circuitry, data paths, or memory devices.

The Court accordingly hereby construes **"wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine"** to mean **"wherein the cable modem engine and the data networking engine are not necessarily physically separate but are functionally separate such that the cable modem functions are performed only by the cable modem engine and the home networking functions are performed only by the data networking engine."**

**4. "DOCSIS functions"**

| **"DOCSIS functions"** ('775 Patent, Claim 19) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | This limitation does not change the scope of claim 18. |

(Dkt. No. 84, at A-5; Dkt. No. 97, at 11; Dkt. No. 104, at 8; Dkt. No. 115, Ex. A, at 3.)

(a) The Parties' Positions

Plaintiff argues that Defendant's proposal is contrary to the doctrine of claim differentiation. (Dkt. No. 97, at 12.)

Defendant responds:

> According to claim 19, all DOCSIS functions are localized in the CME. However, as explained . . . above, the specification explains that the sine qua non of a CME is that it 'performs all cable modem functions' including 'the entire DOCSIS cable modem functionality.' Accordingly, claim 19 is redundant and does not further limit the scope of claim 18. Otherwise, the term 'cable modem engine' is indefinite.

(Dkt. No. 104, at 9.)

Plaintiff replies that there is no redundancy because "Claim 18 recites the broader 'cable modem functions,' which does not necessarily have the same scope as 'all *DOCSIS* functions,' referring to the DOCSIS standard." (Dkt. No. 110, at 3.)

At the June 13, 2023 hearing, the parties argued this term together with the above-discussed ". . . in a first circuit . . ." and ". . . in a second circuit . . ." terms.

(b) Analysis

Claim 19 of the '775 Patent depends from Claim 18 and recites:

> 19. A cable modem system as claimed in claim 18, wherein all DOCSIS functions are localized in the cable modem engine.

Plaintiff applies the doctrine of claim differentiation, arguing:

> Claim 18 states that the CME comprises a processor, programmed with software, that when executed causes the CME to perform "cable modem functions other than the home networking functions performed by the [DNE]." Dependent claim 19 increases the burden on the CME—"all DOCSIS functions are localized in the [CME]." Logically, claim 18 does not require that each and every DOCSIS function be executed by the circuitry of the CME, while claim 19 does.

(Dkt. No. 97, at 12.)

As a general matter, "[c]laim differentiation is 'not a hard and fast rule,' but rather a presumption that will be overcome when the specification or prosecution history dictates a contrary construction." *GPNE Corp. v. Apple Inc.*, 830 F.3d 1365, 1371 (Fed. Cir. 2016).

Defendant argues that this limitation set forth in Claim 19 is redundant (and thus does not imply the absence of such a limitation in Claim 18) because Claim 18, read in light of the specification, already requires this limitation. (*See* Dkt. No. 104, at 9.) Defendant argues that "cable modem engine" "is a phrase coined by the inventors" and "[i]f it does not refer to the components of a cable modem that perform all the cable modem functions, then there is no way to know what it is." (*Id.*, at 9.)

Defendant cites disclosure in the Abstract that the CME "performs all cable modem functions" and "implements the entire DOCSIS cable modem functionality." '775 Patent at Abstract & 2:55–56. The Abstract, however, is not limiting, and the portion of the written description cited by Defendant does not purport to limit the entire claimed invention but rather describes a particular embodiment of "cable modem engine 110." *See Phillips*, 415 F.3d at 1323. Further, there is a "presumption that each claim in a patent has a different scope." *Comark Comm'cns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998). The contrary opinion of Defendant's expert is unpersuasive. (*See* Dkt. No. 97, Ex. 8, Apr. 4, 2023 Almeroth Decl. at ¶ 36 (citing '775 Patent at 2:15–17 ("In one implementation, the VoIP functionality provided by the

cable modem is in accordance with the PacketCable specification and the data networking functionality provided by the data networking engine is in accordance with the CableHome specification."), 2:23–24 ("Data and home networking functionality is provided by a data networking engine, and DOCSIS and VoIP functionality is provided by a cable modem engine.") & 4:19–21).)

The Court therefore hereby expressly rejects Defendant's attempted reliance on Claim 19 to arrive at a narrow interpretation of "cable modem engine" in Claim 18, and no further construction is necessary as to Claim 19. *See U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997) ("Claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the determination of infringement. It is not an obligatory exercise in redundancy."); *see also O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) ("[D]istrict courts are not (and should not be) required to construe every limitation present in a patent's asserted claims."); *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1207 (Fed. Cir. 2010) ("Unlike *O2 Micro*, where the court failed to resolve the parties' quarrel, the district court rejected Defendants' construction."); *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1326 (Fed. Cir. 2012); *Summit 6, LLC v. Samsung Elecs. Co., Ltd.*, 802 F.3d 1283, 1291 (Fed. Cir. 2015); *Bayer Healthcare LLC v. Baxalta Inc.*, 989 F.3d 964, 977–79 (Fed. Cir. 2021).

The Court accordingly hereby construes **"DOCSIS functions"** to have its **plain meaning**.

**5. "DOCSIS MAC processor" and "DOCSIS controller"**

| **"DOCSIS MAC processor"** ('775 Patent, Claim 18) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning. No construction necessary. | The DOCSIS MAC processor as described in the patent specification (*see, e.g.,* '775 Patent at 3:1–20; 4:41–57; *id.* at FIGs. 1 & 2). Otherwise indefinite. |
| **"DOCSIS controller"** ('775 Patent, Claim 18) | |
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning. No construction necessary. | The DOCSIS controller as described in the patent specification (*see, e.g.,* '775 Patent at 3:21–48; 4:41–57; *id.* at FIGs. 1 & 2). Otherwise indefinite. |

(Dkt. No. 84, at A-6; Dkt. No. 97, at 12; Dkt. No. 115, Ex. A, at 1–2.)

(a) The Parties' Positions

Plaintiff urges that Defendant's proposals would improperly limit these terms to specific exemplary embodiments described in the specification. (Dkt. No. 97, at 12.) Plaintiff also argues that Defendants have already agreed that these are *not* means-plus-function terms governed by 35 U.S.C. § 112, ¶ 6. (*Id.*) Further, Plaintiff submits that "[t]he Federal Circuit and this Court have held that the terms 'processor' and 'controller' denote known classes of structures—generally understood to POSITAs." (*Id.* (citations omitted).)

Defendant responds that "[n]either the phrase 'DOCSIS MAC processor' nor 'DOCSIS controller' has a plain meaning." (Dkt. No. 104, at 9.) Defendant also argues that Plaintiff's proposed construction would either contradict the specification or "make it impossible to distinguish a DOCSIS MAC processor from a DOCSIS controller." (*Id.*, at 9–10.) Defendant

urges that "[t]he only construction of DOCSIS MAC processor and DOCSIS controller that both comports with the specification and provides a basis for distinguishing between the two is a construction whereby each refers to the corresponding device described in the specification." (*Id.*, at 11.)

Plaintiff replies that "the claims themselves describe the functions of the DOCSIS MAC processor and DOCSIS controller," and "Charter has made no argument that the DOCSIS MAC processor and DOCSIS controller should be limited to the specific ARM-based embodiments disclosed in the specification." (Dkt. No. 110, at 3–4.)

At the June 13, 2023 hearing, Defendant submitted that the DOCSIS controller disclosed in the specification performs some MAC functions. Defendant argued that this makes it impossible to distinguish between a "DOCSIS MAC processor" and a "DOCSIS controller," which, in turn, Defendant argued makes it impossible to determine whether an accused instrumentality meets the limitation of "forward[ing] the processed packets directly to the data networking engine without the involvement of the DOCSIS controller."

(b) Analysis

Claim 18 of the '775 Patent recites (emphasis added):

> 18. A cable modem system comprising:
>
> a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;
>
> a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking

> engine, the cable modem engine including a *DOCSIS controller* and a *DOCSIS MAC processor*, the *DOCSIS MAC processor* configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the *DOCSIS controller* in order to boost downstream throughput; and
>
> a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

The words "processor" and "controller" refer to known classes of structures in the relevant art, and the parties agree that "DOCSIS" (Data Over Cable Service Interface Specification) and DOCSIS "MAC" (Medium Access Control) have been well-known at all relevant times. (*See, e.g.*, Dkt. No. 97, Ex. 7, Apr. 14, 2023 Kramer Decl. at ¶ 84.)

Defendant proposes to limit these terms to the particular DOCSIS controller and DOCSIS MAC processor disclosed in the specification, but Defendant does not show any definition or disclaimer that would warrant a narrowing of these terms. *See Thorner v. Sony Computer Ent. Am. LLC*, 669 F.3d 1362, 1367 (Fed. Cir. 2012) ("The patentee is free to choose a broad term and expect to obtain the full scope of its plain and ordinary meaning unless the patentee explicitly redefines the term or disavows its full scope.").

Moreover, other claims of the patent-in-suit can be considered. *See Phillips*, 415 F.3d at 1314. Claim 1 recites a "DOCSIS MAC processor" and a "DOCSIS controller," and Claim 12 depends from Claim 1 and recites that "the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor." Because claim terms should be interpreted consistently throughout all of the claims of a particular patent, *id.*, the doctrine of claim differentiation weighs against limiting the "DOCSIS MAC processor" and a "DOCSIS controller" to ARM9TDMI, ARM940, or any other particular specific implementation.

The disclosure in the specification regarding "functional blocks" is also consistent with interpreting these terms broadly rather than limiting them to particular types of processors. *See* '775 Patent at 2:55–3:38; *see also* Dkt. No. 97, Ex. 7, Apr. 14, 2023 Kramer Decl. at ¶¶ 92–93.

Further, Defendant cites disclosure in which the DOCSIS controller is involved with MAC functions (*see* '775 Patent at 3:27–48), but although the claim requires a "DOCSIS MAC processor configured to . . . forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller," the absence of involvement of the DOCSIS controller in this particular operation does not preclude the DOCSIS controller from being involved with other MAC functions.

Finally, Defendant cites the opinions of its expert that a person of ordinary skill in the art would be unable to distinguish between a "DOCSIS MAC processor" and a "DOCSIS controller," but these opinions are unpersuasive, particularly given that DOCSIS is a well-established standard and that MAC is also a well-known term in the relevant art. (*See* Dkt. No. 97, Ex. 8, Apr. 4, 2023 Almeroth Decl. at ¶¶ 76–77.) Any remaining question regarding distinguishing between a "DOCSIS MAC processor" and a "DOCSIS controller" pertains to factual questions of infringement rather than any legal question for claim construction. *See PPG Indus. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1355 (Fed. Cir. 1998) ("after the court has defined the claim with whatever specificity and precision is warranted by the language of the claim and the evidence bearing on the proper construction, the task of determining whether the construed claim reads on the accused product is for the finder of fact"); *see also Acumed LLC v. Stryker Corp.*, 483 F.3d 800, 806 (Fed. Cir. 2007) ("[t]he resolution of some line-drawing problems . . . is properly left to the trier of fact") (citing *PPG*, 156 F.3d at 1355); *Eon Corp. IP Holdings LLC v. Silver Spring*

*Networks, Inc.*, 815 F.3d 1314, 1318–19 (Fed. Cir. 2016) (citing *PPG*, 156 F.3d at 1355; citing *Acumed*, 483 F.3d at 806).

The Court therefore hereby expressly rejects Defendant's proposed constructions, and no further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at 1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes **"DOCSIS MAC processor"** and **"DOCSIS controller"** to have their **plain meaning**.

## V. DISPUTED TERMS IN U.S. PATENT NO. 9,825,826

The '826 Patent is a continuation of the '008 Patent.

Plaintiff submits: "The '826 and the '008 Patents disclose methods and apparatuses that can be implemented in Customer Premises Equipment (CPE) that enable the CPE to: receive a cable or satellite television signal, digitize said signal, determine a characteristic of the digitized signal, and then report the determined characteristic back to the source of the signal (*i.e.*, the network-based service providers) without interrupting normal customer service." (Dkt. No. 97 at 3.)

The '008 Patent, titled "Method and Apparatus for Spectrum Monitoring," issued on July 29, 2014, and bears an earliest priority date of September 8, 2011. The Abstract of the '008 Patent states:

> A system, such as a satellite reception assembly or customer premises gateway, may comprise an analog-to-digital converter operable to digitize a signal spanning an entire television spectrum (e.g., cable television spectrum or satellite television spectrum) comprising a plurality of television channels. The system may comprise a signal monitor operable to analyze a signal to determine a characteristic of the signal. The system may comprise a data processor operable to process a television channel to recover content carried on the television channel. The system may comprise a channelizer operable to select first and second portions of the signal,

and concurrently output the first portion to the signal monitor and the second portion to the data processor.

**6. "network management messages"**

| **"network management messages"** ('826 Patent, Claim 1) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning. No construction necessary. | Messages which report on the status of the network based on an analysis of the measured characteristics. |

(Dkt. No. 84, at A-8; Dkt. No. 97, at 15; Dkt. No. 104, at 12; Dkt. No. 115, Ex. A, at 5.)

(a) The Parties' Positions

Plaintiff argues that "[t]he Court should construe this term according to its plain and ordinary meaning because 'network management message' is a plain English phrase that means exactly what it says," and "[t]he '826 Patent's specification confirms the phrase is meant to convey all its ordinary possibilities, in disclosing a list of exemplary types/uses of the messages." (Dkt. No. 97, at 15 (citations omitted).)

Defendant responds that Plaintiff attempts to encompass implementations in which the set-top box returns only a measured characteristic and nothing else to the headend, which Defendant argues is inconsistent with the claim requirement that "said measured characteristic is *different than* said network management messages." (Dkt. No. 104, at 12 (emphasis modified).)

Plaintiff replies that Defendant improperly relies on claim language in the parent '008 Patent in an attempt to limit Claim 1 of the continuation '826 Patent. (Dkt. No. 110, at 4.) Plaintiff also argues that Defendant's argument pertains to a question of fact, not claim construction. (*Id.*)

At the June 13, 2023 hearing, Defendant submitted that although Defendant is *not* arguing that the message cannot include the measured characteristic, the message must include something

that is *not* the measured characteristic. As for Plaintiff's interpretation that a *message* conveying just the measured characteristic is "different" than the measured characteristic *itself*, Defendant argued that this would vitiate the claim requirement that "said measured characteristic is different than said network management messages."

(b) Analysis

Claim 1 of the '826 Patent recites (emphasis added):

> 1. A method comprising:
> performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network:
> receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels;
> digitizing said received signal to generate a digitized signal;
> selecting a first portion of said digitized signal;
> selecting a second portion of said digitized signal;
> processing said selected second portion of said digitized signal to recover information carried in said plurality of channels;
> analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal; and
> controlling the transmission of *network management messages* back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said *network management messages*.

On one hand, the specification discloses that messages sent to the headend can include measured characteristics:

> The CMTS 114 may process the messages and, in an example embodiment, adjust transmission parameters (e.g., modulation parameters, transmit power, frequency offsets, etc.) and/or perform other maintenance/management based on the received messages.
>
> * * *
>
> Such message may comprise, for example, network status updates indicating whether one or more communication parameters of one or more received television or DOCSIS channels are outside acceptable bounds, and/or *conveying measured/determined characteristics* back to a source of the received signal (e.g., back to a cable headend).

'826 Patent at 3:11–15 & 3:63–4:2 (emphasis added).

On the other hand, the claim here at issue, Claim 1 of the '826 Patent, recites that "said measured characteristic is *different than* said network management messages." Thus, simply sending the measured characteristic to the headend is insufficient to meet this claim limitation. Also of note, this contrasts with the recital in Claim 1 of the related '008 Patent of "report[ing] said determined characteristic to a source of said received signal."

Nonetheless, Defendant's proposal of an "*analysis* of the measured characteristics" lacks sufficient support in the specification. Defendant cites disclosures regarding "analyz[ing]" and whether one or more channels are "outside acceptable bounds":

> The monitoring module 154 may be operable to *analyze* the band $C_{J+1}$ that it receives from the channelizer 102 to *measure/determine characteristics* such as, for example, signal power level vs. frequency, delay vs. frequency, phase shift vs. frequency, type and/or amount of modulation, code rate, interference levels, signal to noise ratio, a transfer function of the channel of [*sic*] over which the signal was received, an impulse response of the channel over which the signal was received, and/or any other characteristic that may help assess characteristics of the channel over which the signal was received, assess characteristics of the transmitter that sent the signal and/or any otherwise be pertinent to performance of the communication system. . . . Additionally or alternatively, the control signal(s) 160 output by the monitoring module 154 may control the transmission of network management/maintenance messages by the device 150. Such message may comprise, for example, network status updates indicating whether one or more communication parameters of one or more received television or DOCSIS channels are *outside acceptable bounds*, and/or conveying *measured/determined* characteristics back to a source of the received signal (e.g., back to a cable headend)[.]

*Id.* at 3:45–4:2 (emphasis added).

This disclosure regarding "acceptable bounds" relates to a specific feature of a particular embodiment and does not warrant introducing a "status" or "analysis" limitation into the construction of "network management messages." *See Phillips*, 415 F.3d at 1323. Further, this disclosure that "[t]he monitoring module 154 may be operable to analyze the band $C_{J+1}$ that it

receives from the channelizer 102 to measure/determine characteristics" likewise pertains to a particular embodiment and, moreover, this usage of "analyze" merely reflects what is already recited elsewhere in the claim, namely "analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal." Defendant's proposal of construing "network management messages" in terms of an "analysis" would tend to confuse rather than clarify the scope of the claim.

Nonetheless, although the claim already recites "transmission of network management messages back to said headend *based on* said measured characteristic of said received signal," Defendant's proposal of "based on" will assist the finder of fact in understanding that merely sending the measured characteristic is insufficient. *See 01 Communique Laboratory, Inc. v LogMeIn, Inc.*, 687 F.3d 1292, 1296 (Fed. Cir. 2012) ("01 Communique has not cited, and we have not discovered, any authority for the proposition that construction of a particular claim term may not incorporate claim language circumscribing the meaning of the term.").

Finally, Defendant discusses Plaintiff's infringement contentions (*see* Dkt. No. 104, at 12–13), but any remaining dispute pertains to factual questions regarding infringement rather than any legal question for claim construction. *See PPG*, 156 F.3d at 1355; *see also Acumed*, 483 F.3d at 806 (citing *PPG*, 156 F.3d at 1355); *Eon*, 815 F.3d at 1318–19 (citing *PPG*, 156 F.3d at 1355; citing *Acumed*, 483 F.3d at 806).

The Court therefore hereby construes **"network management messages"** to mean **"messages which report on the network based on the measured characteristics."**

## VI. DISPUTED TERMS IN U.S. PATENT NO. 8,792,008

### 7. "operable to"

| **"operable to"** ('008 Patent, Claim 1) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | Configured to |

(Dkt. No. 84, at A-8; Dkt. No. 97, at 16; Dkt. No. 104, at 13.)

In their Amended Patent Rule 4-5(d) Joint Claim Construction Chart, the parties agree that "operable to" should be construed to mean "configured to." (Dkt. No. 115, Ex. A, at 3.)

The Court therefore hereby construes **"operable to"** to mean **"configured to."**

### 8. "digitize a received signal spanning an entire television spectrum comprising a plurality of television channels"

| **"digitize a received signal spanning an entire television spectrum comprising a plurality of television channels"** ('008 Patent, Claim 1) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | The "received signal" contains only television channels. |

(Dkt. No. 84, at A-9; Dkt. No. 97, at 16; Dkt. No. 104, at 13; Dkt. No. 115, Ex. A, at 3–4.)

(a) The Parties' Positions

Plaintiff argues that "[t]he plain language of the claim recites '*comprising* a plurality of television channels,' indicating that the 'received signal spanning an entire television spectrum' is *not limited* to only television channels." (Dkt. No. 97, at 16.) Plaintiff also argues that the specification confirms this understanding. (*See id.*, at 17.)

Defendant responds that "'[s]pan' is a plain English word which means the full extent of something from end to end (*e.g.*, 'wing span,' 'life span,' 'span of a bridge')." (Dkt. No. 104, at 14.)

Plaintiff replies that "a television spectrum may contain inside it something in addition to individual television channels," and "[i]t does not cease being a television spectrum if non-video signals are added within the block." (Dkt. No. 110, at 4–5.)

At the June 13, 2023 hearing, Defendant alternatively proposed: "The 'received signal' contains only television channels and data channels which fall between television channels."

(b) Analysis

Claim 1 of the '008 Patent recites (emphasis added):

> 1. A system comprising:
> an analog-to-digital converter operable to *digitize a received signal spanning an entire television spectrum comprising a plurality of television channels*, said digitization resulting in a digitized signal;
> a signal monitor operable to:
> analyze said digitized signal to determine a characteristic of said digitized signal; and
> report said determined characteristic to a source of said received signal;
> a data processor operable to process a television channel to recover content carried on the television channel; and
> a channelizer operable to:
> select a first portion of said digitized signal;
> select a second portion of said digitized signal; and
> concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

As a general matter, "[t]he transitional term 'comprising' . . . is open-ended and does not exclude additional, unrecited elements or method steps." *See Gillette Co. v. Energizer Holdings, Inc.*, 405 F.3d 1367, 1371 (Fed. Cir. 2005).

Defendant submits authority that "[t]he usage 'comprising' means that additional components may be present in the device, but does not change the elements that are stated in the claim." *Outside the Box Innovations, LLC v. Travel Caddy, Inc.*, 695 F.3d 1285, 1305 (Fed. Cir. 2012).

But although the claim language refers to "television spectrum" and refers to the television spectrum comprising television channels, this does *not* preclude non-television channels from being present within that spectrum. In other words, Defendant has not shown that this usage of "comprising" is somehow closed-ended. Also, Defendant's reliance at the June 13, 2023 hearing on a general-purpose dictionary definition of "spanning" as referring to the "extent" of something "between any two limits," even if found relevant, is unpersuasive. *Collins English Dictionary* (30th ed.).

This finding is consistent with disclosures in the specification that the received signal may include data from an IP network or may include DOCSIS channels:

> For downstream traffic, the headend 108 may receive television signals via the antenna 102 and the satellite dish 104, and *may receive data via the IP network 106*. The switch 110 may convey the television signals to the video modulator 112 and the data to the CMTS 114. The video modulator 112 may modulate the received television signals onto a carrier. The CMTS 114 may modulate the received data onto carrier. The splitter/combiner 116 may *combine the outputs* of the video modulator 112 and the CMTS 114 resulting in a frequency division multiplexed (FDM) *signal comprising one or more television channels and/or one or more DOCSIS channels*.
>
> * * *
>
> The RF receive front-end 158 may be operable to process a received RF signal S to generate a digital signal D. The signal S may be the result of *a plurality of television and/or DOCSIS channels* being frequency division multiplexed into a *single signal*. The signal S may occupy a frequency band from $F_{lo}$ to $F_{hi}$.

'008 Patent at 2:44–54 & 3:12–16 (emphasis added); *see id.* at 4:45–47 ("The data processing module 156 may process one or more of bands $C_1$–$C_J$ to recover data on one or more channels

(e.g., television and/or DOCSIS channels) . . . .") & 5:60–62 ("Accordingly, for cable television/DOCSIS, the ADC 256 may be operable to digitize the entire cable downstream (e.g., from ~55 MHz to ~1002 MHz).").

Further, Defendant points to the express recital in Claim 1 of the '826 Patent that the received signal comprises "one or both of television and data channels," but this recital in a different independent claim in a different (albeit related) patent does not imply or otherwise justify a narrow interpretation of the disputed term in Claim 1 of the '008 Patent. Further, as Plaintiff argued at the June 13, 2023 hearing, whereas Claim 1 of the '826 Patent allows for there being only data channels, Claim 1 of the '008 Patent requires television channels.

Finally, at the June 13, 2023 hearing, Defendant proposed that "[t]he 'received signal' contains only television channels and data channels which fall between television channels." Defendant thus proposes that a data channel cannot overlap (or be subsumed within) a television channel. As discussed above, Defendant does not demonstrate that the disputed term precludes the presence of data channels within the same spectrum as television channels. The Court therefore rejects Defendant's alternative proposal.

The Court thus hereby expressly rejects Defendant's proposed constructions. No further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at 1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes **"digitize a received signal spanning an entire television spectrum comprising a plurality of television channels"** to have its **plain meaning**.

**9. "signal monitor," "data processor," and "channelizer"**

| **"signal monitor"<br>"data processor"<br>"channelizer"**<br>('008 Patent, Claim 1) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | Three separate pieces of hardware, configured to perform the functions the claim ascribes to the signal monitor, data processor, and channelizer, respectively. |

(Dkt. No. 84, at A-9; Dkt. No. 97, at 17; Dkt. No. 104, at 14; Dkt. No. 115, Ex. A, at 4.)

(a) The Parties' Positions

Plaintiff argues that Defendant's proposal should be rejected because "[n]o phrase [in the claim] even arguably related to separateness is present," and "the specification is clear that these three items do *not* have to be implemented on separate pieces of hardware." (Dkt. No. 97, at 17.)

Defendant responds:

> Entropic contends that there need not be any 'separateness' between the three, and that they can all refer to the same physical device. Entropic provides no support for its contention that this is the 'plain and ordinary meaning' of these terms, or any facts to overcome the presumption that each of these must be a distinct physical component. . . . Nor could Entropic possibly overcome this presumption, as neither the claims nor the specification make any sense unless each of the three is a separate device.

(Dkt. No. 104, at 14–15 (citation omitted).)

Plaintiff replies that Defendant is attempting to argue a question of fact regarding what is separate, as part of claim construction, which Plaintiff submits is improper. (Dkt. No. 110, at 5.) Plaintiff also submits that "[b]y the priority date (2011), it was exceedingly common for a single

SoC [(System on a Chip)] to embody many functional elements, as a POSITA would have been well aware." (*Id.* (footnote omitted).)

At the June 13, 2023 hearing, Defendant argued that these terms refer to three structures that might even be on a single chip but that nonetheless must be physically separate pieces of hardware.

(b) Analysis

Claim 1 of the '008 Patent recites (emphasis added):

> 1. A system comprising:
> an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;
> a *signal monitor* operable to:
> analyze said digitized signal to determine a characteristic of said digitized signal; and
> report said determined characteristic to a source of said received signal;
> a *data processor* operable to process a television channel to recover content carried on the television channel; and
> a *channelizer* operable to:
> select a first portion of said digitized signal;
> select a second portion of said digitized signal; and
> concurrently output said first portion of said digitized signal to said *signal monitor* and said second portion of said digitized signal to said *data processor*.

As a general matter, "[w]here a claim lists elements separately, 'the clear implication of the claim language' is that those elements are 'distinct component[s]' of the patented invention." *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010); *see Kyocera Senco Indus. Tools Inc. v. Int'l Trade Comm'n*, 22 F.4th 1369, 1382 (Fed. Cir. 2022) (listing components separately in a claim gives rise to "a presumption that those components are distinct").

Defendant does not show, however, that a requirement for "distinct" components, *id.*, necessarily requires separate pieces of hardware. Also, the specification discloses that "[t]he various modules of the subassembly 174," including "the signal monitor 154, data processor 156, and channelizer 152," "may reside in . . . one or more integrated circuits." *See id.* at 4:56–59 & Fig. 1C. Defendant argues that "[w]hat this sentence means is that each individual module can be one or more integrated circuits, not that all of the different modules can be one device" (Dkt. No. 104, at 16), but here, too, the patentee did not express or imply any physical separation.

Finally, at the June 13, 2023 hearing, Defendant emphasized disclosure regarding "[t]he parallel arrangement of the monitoring module 154 and data processing module 156," but this disclosure pertains to a specific embodiment and therefore should not be imported into the claim. *See Phillips*, 415 F.3d at 1323. Also, Defendant does not show that a "parallel arrangement" necessarily implies physically separate structures.

The Court therefore hereby expressly rejects Defendant's proposed construction. No further construction is necessary. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at 1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes **"signal monitor," "data processor,"** and **"channelizer"** to have their **plain meaning**.

## VII. DISPUTED TERMS IN U.S. PATENT NO. 8,284,690

The '690 Patent, titled "Receiver Determined Probe," issued on October 9, 2012, and bears an earliest priority date of December 15, 2008. Plaintiff submits that the '690 Patent "relates generally to aiding in the diagnosis of problems with subscriber services." (Dkt. No. 97 at 4.)

The Abstract of the '690 Patent states:

> According to various embodiments of the disclosed method and apparatus, nodes on a network are programmed to generate a probe transmission in response to a request from the node that will be receiving the probe. The receiving node may generate a probe request that specifies a plurality of parameters, such as a modulation profile for the probe; the payload content of the probe; the number of times to transmit the probe; a number of symbols for the payload of the probe; a preamble type for the probe; a cyclic-prefix length for the payload of the probe; a transmit power for the probe; and a transmit power scaling factor for the payload of the probe.

**10. "probe" and "physical layer probe"**

| **"probe"**<br>('690 Patent, Claims 1, 7, 8, 9, 11) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | A packet transmitted to a network node which the node compares to a reference packet having a known form in order to determine characteristics of the channel on which the packet was transmitted. |
| **"physical layer probe"**<br>('690 Patent, Claim 9) | |
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | "Physical layer probe" means probe. Otherwise indefinite. |

(Dkt. No. 84, at A-10; Dkt. No. 97, at 18; Dkt. No. 104, at 18; Dkt. No. 115, Ex. A, at 7–9 & 11.)

(a) The Parties' Positions

Plaintiff argues that these are different terms and are therefore presumed to have different meanings. (Dkt. No. 97, at 18.) Plaintiff also argues that "Charter's proposed construction imposes on 'probe' a lengthy requirement of a specific function, in clear violation of the rule against importing the specification into the claim." (*Id.* (citation omitted).)

Defendant responds: "Entropic asserts that 'probe' should be construed according to its plain and ordinary meaning, but it does not explain which of the many 'plain meanings' of the word 'probe' applies. Charter's construction, taken from the patent specification, *is* the plain meaning in the context of probes sent between nodes in a network. The DOCSIS specification confirms this." (Dkt. No. 104, at 18.) As for Defendant's proposal of "packet," Defendant submits that "'[p]acket' is in the construction to avoid having the word 'probe' in the construction of 'probe' and because probes *are* packets." (*Id.*)

Plaintiff replies that "Charter grounds its argument to limit 'probe' based on *post-priority, extrinsic* evidence," and "Charter's focus seems to be on the DOCSIS 3.1 cable modems accused of infringement in this case, thereby committing error in construing the claims with reference to the accused devices." (Dkt. No. 110, at 6 (citation omitted).) Also, "with respect to 'physical layer probe,' Charter errs by importing an embodiment into the claims." (*Id.*)

At the June 13, 2023 hearing, Plaintiff alternatively proposed that a "probe" is "a signal used to determine one or more characteristics of a channel." Defendant disagreed with Plaintiff's alternative proposal, but Defendant had no objection to replacing "packet" with "signal" in Defendant's proposed construction.

(b) Analysis

The specification discloses that "probes" are used, for example, to determine characteristics of channels:

> In some instances, probes are sent between nodes of the network in order to allow a receiving node on the network to determine some of the characteristics of the channel between the receiving node and the transmitting node. These probes are typically well defined. Accordingly, the receiving node knows before reception what reference signal was transmitted. By comparing the reference probe with the actual received probe, the receiver can determine some of the characteristics of the channel between the transmitting and receiving node.

> * * *
>
> In various embodiments, these receiver determined probes may be used in a variety of applications. For example, the probes may be used to reach or discover hidden nodes; in networks employing orthogonal frequency division multiple access (OFDMA), the probes may be used for OFDMA subchannel assessment; or in networks accessible by content providers, the probes may be used for off-site network diagnosis.
>
> * * *
>
> In block 204, the requesting node receives the probe generated according to its earlier probe request. The received probe may then be used in further processing in block 205. In one embodiment, the received probe may be used in channel analysis to determine a bitloading table, FEC and other communication parameters for OFDM or OFDMA signals for future transmissions from the probe transmitter. In another embodiment, post reception processing might comprise generating a report from the probe and transmitting this probe report to the requesting node or to a designated entity.

'690 Patent at 1:48–57, 2:20–27 & 6:59–7:11.

Claim 9 of the '690 Patent is limited to a "physical layer probe," and the subsequent recitals of "the probe" in Claim 9 can be readily understood as referring back to the recital of a "physical layer probe" (emphasis added):

> 9. A method comprising:
>
> a) a first node transmitting a probe request to a second node, the probe request specifying a first plurality of probe parameters for *a physical layer probe*, the first plurality of probe parameters comprising a form for *the probe* including a modulation profile for *the probe*;
>
> b) the first node receiving *the probe* from the second node, wherein *the probe* is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node.

The other independent claim of the '690 Patent that recites a "probe" is Claim 1, which recites (emphasis added):

> 1. A method comprising:
>
> a) receiving in a first node, a probe request specifying a first plurality of parameters associated with the generation and transmission of *a probe*, wherein the first plurality of parameters at least specify content payload of *the probe* and a second node;

> b) determining a second plurality of parameters associated with generation and transmission of *the probe*;
>
> c) generating *the probe* in accordance with the first plurality of parameters and the second plurality of parameters, wherein *the probe* has a form dictated by the first plurality of parameters; and
>
> d) transmitting *the probe* from the first node to the second node.

Defendant argues that a "probe," even in Claim 1, is necessarily a physical layer signal. In some cases, "[d]ifferent terms or phrases in separate claims may be construed to cover the same subject matter where the written description and prosecution history indicate that such a reading of the terms or phrases is proper." *Nystrom v. TREX Co., Inc.*, 424 F.3d 1136, 1143 (Fed. Cir. 2005). Defendant submits that the patent speaks only of generating physical layer ("PHY") packets. (Dkt. No. 104, at 18 (citing '690 Patent at 3:3–5, 3:40–64 & 5:59).) Defendant also submits authority that "[t]he preference for giving meaning to all terms, however, is not an inflexible rule that supersedes all other principles of claim construction." *SimpleAir, Inc. v. Sony Ericsson Mobile Commc'ns AB*, 820 F.3d 419, 429 (Fed. Cir. 2016) (citation omitted).

Defendant also cites the DOCSIS specification, which states "[a] probe is a wideband physical-layer signal . . . ." (Dkt. No. 104, Ex. 4, *Data-Over-Cable Service Interface Specifications, DOCSIS 3.1*, at 20 & 57 (CHARTER_ENTROPIC00101891 & CHARTER_ENTROPIC00101928).) This statement, however, is not set forth as a broadly applicable definition but rather is set forth as part of a discussion of a specific feature. *See id.*

On balance, using a "physical layer" probe is a specific feature of particular disclosed embodiments that should not be imported into the claims. *See Phillips*, 415 F.3d at 1323. To the extent Defendant maintains that a "probe" must be a "physical layer" probe because no other type of probe is disclosed in the specification, Defendant's argument perhaps may pertain to arguments regarding the enablement or written description requirements but does warrant importing such a limitation into the claims.

Further, the recital of "a probe" in Claim 1 and "a physical layer probe" in Claim 9, as set forth above, weighs at least somewhat further against Defendant's proposal of limiting "probe" to being a "physical layer probe." *See id.* at 1314 (noting that "terms are normally used consistently throughout the patent," and "[o]ther claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term").

As for Defendant's proposal of referring to a "packet," Defendant submits that the patent relates to packet-based networks, disclosing for example:

> In the illustrated embodiment, the communications protocol specifies a packet based communications system. In this embodiment, physical layer (PHY) packets comprise preambles and payloads.

'690 Patent at 3:40–44. The specification, however, refers more broadly to a probe "signal." *Id.* at 1:48–57. As noted above, at the June 13, 2023 hearing, Defendant was amenable to replacing "packet" with "signal."

Finally, at the June 13, 2023 hearing, Defendant urged that Plaintiff is attempting to interpret "probe" to encompass *new* information, which Defendant argued is contrary to the specification and the plain meaning of "probe" as referring to a signal that is already known (so that it can be compared to a reference signal). Defendant's argument in this regard is persuasive at least so far as "probe" should be limited to a signal that can be compared to a reference signal having a known form, and this is consistent with the Description of the Related Art portion of the specification. *See* '690 Patent at 1:48–57 (reproduced above).

The Court therefore hereby construes these disputed terms as follows:

| Term | Construction |
|---|---|
| **"probe"**<br>('362 Patent, Claim 11) | **"a signal transmitted to a network node that the network node can compare to a reference signal having a known form in order to determine characteristics of the channel on which the signal was transmitted"** |
| **"physical layer probe"**<br>('690 Patent, Claim 9) | **Plain meaning** (apart from the Court's construction of "probe," above) |

**11. "probe request"**

| **"probe request"**<br>('690 Patent, Claims 1, 7, 8, 9, 11, 15, 16) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | A request sent by a first network node to a second network node which defines the form of a probe to be generated and transmitted by the second network node. The probe request specifies at least the content payload of the probe. |

(Dkt. No. 84, at A-11; Dkt. No. 97, at 19; Dkt. No. 104, at 19; Dkt. No. 115, Ex. A, at 7–12.)

(a) The Parties' Positions

Plaintiff argues that "[t]he plain language of the claims confirms that 'probe request' means exactly what it sounds like—a request for a probe." (Dkt. No. 97, at 19.) Plaintiff also argues that Defendant's proposed construction is confusing and incorporates features that are recited elsewhere in the claims. (*Id.*, at 20.)

Defendant responds that "'probe request' could not possibly have had a plain and ordinary meaning in the context of the alleged invention" because "[*t*]*he probe request is the invention*." (Dkt. No. 104, at 19.) Defendant submits that "the specification explains exactly

what this allegedly novel 'probe request' is." (*Id.*) Further, Defendant argues that "to whatever extent the inventor's definition of 'probe request' makes that definition redundant with other claim language, the inventor's definition still governs . . . ." (*Id.*, at 20.)

Plaintiff replies that "well-known components can be used or joined in novel ways," and "[h]ere, 'probe request' means simply a request for a probe," which "must meet certain criteria, but those are defined by the other elements of the claim, not by 'probe request' itself." (Dkt. No. 110, at 7.) Plaintiff also argues that "[Defendant's] resort to lexicography fails because the relied-upon passage is a description, not a definition which meets the high and 'exacting' legal hurdle." (*Id.* (citation omitted).)

At the June 13, 2023 hearing, Plaintiff argues that a "probe request" could specify things other than form, such as transmission power.

(b) Analysis

Claim 1 of the '690 Patent recites (emphasis added):

> 1. A method comprising:
>
> a) receiving in a first node, a *probe request* specifying a first plurality of parameters associated with the generation and transmission of a probe, wherein the first plurality of parameters at least specify content payload of the probe and a second node;
>
> b) determining a second plurality of parameters associated with generation and transmission of the probe;
>
> c) generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters; and
>
> d) transmitting the probe from the first node to the second node.

The Brief Summary section of the specification states:

> The receiving node may generate a probe request that specifies a plurality of parameters to be used in such a "receiver determined" probe to generate a probe having the "form" specified by these parameters. Accordingly, the probe request specifies a plurality of parameters associated with the generation and transmission of a probe, including the content of a payload of the probe. In one embodiment, the parameters further include: the modulation profile for the probe; the payload

> content of the probe; the number of times to transmit the probe; the number of symbols for the payload of the probe; the preamble type for the probe; the cyclic-prefix length for the payload of the probe; the transmit power for the probe; and the transmit power scaling factor for the payload of the probe. Accordingly, the probe that is transmitted in response to the probe request will have a form dictated by the parameters specified in the probe request.

'690 Patent at 2:3–19.

Contrary to Defendant's suggestion that this disclosure amounts to a definition, no lexicography is apparent. That is, Defendant does not identify any expression of a clear intent by the patentee to set forth a definition for the term "probe request." *See Irdeto Access, Inc. v. EchoStar Satellite Corp.*, 383 F.3d 1295, 1301 (Fed. Cir. 2004) ("It is well-established that the patentee can act as his own lexicographer, so long as he *clearly* states any special definitions of the claim terms in the patent specification or file history.") (emphasis added) (citing *Vitronics*, 90 F.3d at 1582).

Nonetheless, "terms coined by the inventor are best understood by reference to the specification." *Intervet Inc. v. Merial Ltd.*, 617 F.3d 1282, 1287 (Fed. Cir. 2010) (citing *Phillips*, 415 F.3d at 1315). Plaintiff replies that "'probe request' means simply a request for a probe," but Plaintiff does not demonstrate that the term "probe request" has any established meaning in the art. The above-reproduced disclosure explains that, as used in the '690 Patent, a probe request is sent by one network node to another network node and defines the form of a probe to be generated and transmitted.

As for Defendant's proposal that "[t]he probe request specifies at least the content payload of the probe," however, the above-reproduced disclosure refers to the payload but the above-reproduced claim language already specifically recites "the first plurality of parameters at least specify content payload of the probe and a second node," which weighs against including this specific requirement in the construction of "probe request." *See, e.g., Apple, Inc. v. Ameranth,*

*Inc.*, 842 F.3d 1229, 1237 (Fed. Cir. 2016) ("Construing a claim term to include features of that term already recited in the claims would make those expressly recited features redundant.").

The Court therefore hereby construes **"probe request"** to mean **"a request, sent by one network node to another network node, that specifies the form of a probe to be generated and transmitted."**

**12. "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters," "wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node," and "the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe"**

| **"generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters"** ('690 Patent, Claim 1)<br><br>**"wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node"** ('690 Patent, Claim 9)<br><br>**"the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe"** ('690 Patent, Claim 9) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | Indefinite |

(Dkt. No. 84, at A-11–A-12; Dkt. No. 97, at 21; Dkt. No. 104, at 20; Dkt. No. 115, Ex. A, at 7–8 & 10–11.)

(a) The Parties' Positions

Plaintiff argues that these terms are not indefinite because "[a] POSITA would understand there are two sets of parameters—one set which relates to the probe's *form*, and another set relating to any characteristic of the probe." (Dkt. No. 97, at 21.)

Defendant argues that "the claims cover the form of the probe being determined only by the parameters in the probe request," and "[t]his renders the claims indefinite" because "[i]f the parameters determined by the probe transmitter are used to generate the probe, those parameters necessarily contribute to defining the form of the probe," and "it is impossible to imagine a parameter used to generate a probe that does not relate to its form." (Dkt. No. 104, at 21.)

Plaintiff replies that "the probe may be based on additional information, namely 'information that previously existed within the transmitting node.'" (Dkt. No. 110, at 8 (citing '690 Patent at 6:42–45).)

At the June 13, 2023 hearing, Defendant urged that any parameter used to generate something is related to its form. Plaintiff responded that the probe transmitter can define some parameters, such as transmission power, based on information existing within the transmitter.

(b) Analysis

Claim 1 of the '690 Patent recites (emphasis added):

> 1. A method comprising:
>
> a) receiving in a first node, a probe request specifying a first plurality of parameters associated with the generation and transmission of a probe, wherein the first plurality of parameters at least specify content payload of the probe and a second node;
>
> b) determining a second plurality of parameters associated with generation and transmission of the probe;
>
> *c) generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters*; and
>
> d) transmitting the probe from the first node to the second node.

The "generating . . ." limitation thus involves a "first plurality of parameters" that dictates the form of the probe and a "second plurality of parameters" that is *not* recited as dictating the form of the probe. The manner in which "generating the probe" is "in accordance" with the "second plurality of parameters" thus is not recited.

Defendant does not show that this gives rise to any inconsistency. The same is true as to the ". . . is generated . . ." and "parameters" limitations recited in Claim 9 of the '690 Patent. The indefiniteness opinion of Defendant's expert is unpersuasive. (*See* Dkt. No. 104, Ex. 8, Apr. 4, 2023 Almeroth Decl. at ¶ 84.) Moreover, the opinion of Plaintiff's expert is persuasive that the "second plurality of parameters" could, for example, affect a payload portion of a probe without affecting the form of the probe. (Dkt. No. 97, Ex. 7, Apr. 14, 2023 Kramer Decl. at ¶ 138.)

Also, Plaintiff persuasively argued at the June 13, 2023 hearing that the transmitter of a probe could define some non-form parameters, such as transmission power, timing, or destination, "based upon information that previously existed within the transmitting node." *See* '690 Patent at 6:33–45.

Finally, Defendant argues that "the specification says nothing about putting parameters into probe payloads." (Dkt. No. 104, at 22.) This argument perhaps may pertain to arguments regarding enablement or written description, but this does not raise any concern regarding indefiniteness.

The Court therefore hereby expressly rejects Defendant's indefiniteness argument, and Defendant presents no alternative proposed constructions.

The Court accordingly hereby construes these terms to have their **plain meaning**.

## VIII. DISPUTED TERMS IN U.S. PATENT NO. 9,210,362

The '362 Patent, titled "Wideband Tuner Architecture," issued on December 8, 2015, and bears an earliest priority date of April 19, 2010. Plaintiff submits that the '362 Patent "relates generally to a receiver system configured to receive a number of channels across a broad radio frequency (RF) spectrum." Dkt. No. 97 at 5.

The Abstract of the '362 Patent states:

> A wideband receiver system comprises a mixer module, a wideband analog-to-digital converter (ADC) module, and digital circuitry. The mixer module is configured to downconvert a plurality of frequencies that comprises a plurality of desired television channels and a plurality of undesired television channels. The wideband ADC module is configured to digitize the swatch [*sic*, swath] of frequencies comprising the plurality of desired television channels and the plurality of undesired television channels. The digital circuitry is configured to select the desired plurality of television channels from the digitized plurality of frequencies, and output the selected plurality of television channels to a demodulator as a digital datastream.

### 13. "downconverting . . . a plurality of frequencies" and Order of Steps in Claim 11

| **"downconverting . . . a plurality of frequencies"** ('362 Patent, Claim 11) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning. No construction necessary. | Downconverting a plurality of frequencies of an analog radio frequency (RF) signal. |
| **Order of Steps** ('362 Patent, Claim 11) | |
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning. No construction necessary. | Claimed steps must be performed in the order recited in the claim. |

(Dkt. No. 84, at A-13; Dkt. No. 97, at 22 & 24; Dkt. No. 104, at 24; Dkt. No. 115, Ex. A, at 12–13.)

(a) The Parties' Positions

Plaintiff submits that "[t]here seems to be general agreement that downconverting is well-understood" and that "[t]he process brings 'down' the frequency of a signal, using a 'mixer' or a 'mixing' process." (Dkt. No. 97, at 23.) Plaintiff argues that no order of steps is required because "[t]here is no grammatical or logical reason why digitizing cannot occur before downconverting or *vice versa* since claim 11 states these steps are performed on the same object—the 'plurality of frequencies.'" (Dkt. No. 97, at 25.) Plaintiff also argues that "because the digitizing step does not refer to the output of the 'downconverting' step (but rather its input), the claim itself requires no particular order of those steps." (*Id.*, at 24.) Further, Plaintiff argues that "[v]iewed in light of the differently ordered embodiments disclosed in the specification, Charter's request for an order of the steps limitation is nothing more than a second attempt by Charter to require that the claimed downconverting is done on an analog signal only." (*Id.*, at 25–26.) Finally, Plaintiff argues that there is no basis for limiting the downconverting to only "radio frequency (RF)" signals. (*Id.*)

Defendant responds that "the language of claim 11 itself dictates that the steps be performed in the order written," and "even if the structure of the claim did not mandate the order of the steps (it does), the specification 'directly or implicitly requires' that the claims be performed in order." (Dkt. No. 104, at 24 & 25 (citation omitted).) "Finally," Plaintiff submits, "claim 11 is written to track the order in which the steps are performed in the specification." (*Id.*, at 26.)

Plaintiff replies that "read in light of the specification, the claim envisions digital and/or analog downconversion of desired and undesired channels." (Dkt. No. 110, at 9.)

At the June 13, 2023 hearing, Defendant argued that Plaintiff is attempting to excise the entire invention from the claim because the purported invention is to reduce the need for expensive analog-to-digital converters by downconverting *before* digitizing. *See* '362 Patent at 2:20–27 &

2:45–55. Plaintiff responded that the Defendant's argument is unavailing because the specification also discloses digital downconversion. *See id.* at 5:31–58 & 9:11–34.

(b) Analysis

"As a general rule, '[u]nless the steps of a method [claim] actually recite an order, the steps are not ordinarily construed to require one.'" *Mformation Techs., Inc. v. Research in Motion Ltd.*, 764 F.3d 1392, 1398 (Fed. Cir. 2014) (quoting *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1342 (Fed. Cir. 2001)).

Courts apply a two-part test to determine whether a particular order of steps is required: "First, we look to the claim language to determine if, as a matter of logic or grammar, they must be performed in the order written," and "[i]f not, we next look to the rest of the specification to determine whether *it* directly or implicitly requires such a narrow construction." *Altiris, Inc. v. Symantec Corp.*, 318 F.3d 1363, 1369–70 (Fed. Cir. 2003) (citation omitted).

Claim 11 of the '362 Patent recites (emphasis added):

> 11. A method comprising:
> in a wideband receiver system:
> *downconverting*, by a mixer module of said wideband receiver system, *a plurality of frequencies* that comprises a plurality of desired television channels and a plurality of undesired television channels;
> *digitizing*, by a wideband analog-to-digital converter (ADC) module of said wideband receiver system, *said plurality of frequencies* comprising said plurality of desired television channels and said plurality of undesired television channels;
> *selecting*, by digital circuitry of said wideband receiver system, said plurality of desired television channels from *said digitized plurality of frequencies*; and
> *outputting*, by said digital circuitry of said wideband receiver system, *said selected plurality of television channels* to a demodulator as a digital datastream.

In some cases, "the sequential nature of the claim steps is apparent from the plain meaning of the claim language." *See Mantech Envtl. Corp. v. Hudson Envtl. Servs., Inc.*, 152 F.3d 1368,

1376 (Fed. Cir. 1998); *see also E-Pass Techs., Inc. v. 3Com Corp.*, 473 F.3d 1213, 1222 (Fed. Cir. 2007) ("[B]ecause the language of most of the steps of its method claim refer to the completed results of the prior step, E–Pass must show that all of those steps were performed in order.").

Here, the "downconverting . . ." step and the "digitizing . . ." step both operate on the same "plurality of frequencies," and there is no reference to "completed results of the prior step." *Id.* Rather, the "downconverting . . ." step and the "digitizing . . ." step both refer to the same "plurality of frequencies" without any indication that one of these steps must necessarily be performed before the other. Further, because the "digitizing . . ." step could potentially be performed before the "downconverting . . ." step, the Court rejects Defendant's proposal to limit "downconverting . . . a plurality of frequencies" to downconverting a plurality of frequencies of an *analog* radio frequency (RF) signal.

The "selecting . . ." step, by contrast, refers to "said digitized plurality of frequencies." The "digitizing . . ." step must therefore be performed before the "selecting . . ." step. *Id.*

The "outputting . . ." step refers to "said selected plurality of television channels." The "selecting . . ." step must therefore be performed before the "outputting . . ." step. *Id.*

Finally, Defendant does not persuasively justify limiting the claim to "radio frequency (RF)" signals. Defendant's reliance on the "complex mixer module" 211/221 illustrated in Figure 2 is unavailing. (*See* Dkt. No. 104, at 25–26 (discussing '362 Patent at Fig. 2).) To the extent the specification discloses downconverting radio frequencies, the use of radio frequencies is a particular feature of disclosed embodiments that should not be imported into the claim. *See Phillips*, 415 F.3d at 1323.

The Court therefore hereby construes these disputed terms as follows:

| Term | Construction |
|---|---|
| **"downconverting . . . a plurality of frequencies"** ('362 Patent, Claim 11) | **Plain meaning** |
| **Order of Steps in Claim 11 of the '362 Patent** | **In Claim 11 of the '362 Patent, the "digitizing . . ." step must be performed before the "selecting . . ." step, and the "selecting . . ." step must be performed before the "outputting . . ." step. No other order of steps is required.** |

## IX. DISPUTED TERMS IN U.S. PATENT NO. 10,135,682

The '682 Patent, titled "Method and System for Service Group Management in a Cable System," issued on November 20, 2018, and bears an earliest priority date of July 23, 2012. Plaintiff submits that the '682 Patent "relates generally to organizing cable modems (CMs) into service groups based on signal-to-noise ratio (SNR) related metrics." (Dkt. No. 97, at 5.)

The Abstract of the '682 Patent states:

> A cable modem termination system (CMTS) may determine, for a plurality of cable modems served by the CMTS, a corresponding plurality of SNR-related metrics. The CMTS may assigning [*sic*] the modems among a plurality of service groups based on the SNR-related metrics. For any one of the modems, the CMTS may configure physical layer communication parameters to be used by the one of the modems based on a SNR-related metric of a service group to which the one of the modems is assigned. The physical layer communication parameters may include one or more of: transmit power, receive sensitivity, timeslot duration, modulation type, modulation order, forward error correction (FEC) type, and FEC code rate. The CMTS and the modems may communicate using orthogonal frequency division multiplexing (OFDM) over a plurality of subcarriers, and the physical layer communication parameters may be determined on a per-subcarrier basis.

**14. "a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics"**

| **"a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics"** ('682 Patent, Claim 1) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | Indefinite |

(Dkt. No. 84, at A-14; Dkt. No. 97, at 26; Dkt. No. 104, at 27; Dkt. No. 115, Ex. A, at 14.)

(a) The Parties' Positions

Plaintiff argues that "[a]ny POSITA familiar with hybrid fiber coaxial ('HFC') networks understands what is meant by an SNR profile and SNR-related metrics," and "the adjectives 'worst-case' and 'composite' have plain meanings to a POSITA." (Dkt. No. 97, at 26 (citations omitted).) Plaintiff also argues that "[t]he specification confirms the claim terms are used in accord with a POSITA's expectations." (*Id.*)

Defendant responds that "[t]here is nothing about this limitation that finds any support in the specification." (Dkt. No. 104, at 27.) Defendant argues: "In view of the specification, 'composite SNR-related metric' *cannot* mean a 'composite *best-case* SNR profile.' It can only refer to the 'worst-case.' And the claim is therefore indefinite, as there is no difference between 'composite SNR-related metric' and 'worst-case SNR profile.'" (*Id.*, at 28.)

Plaintiff replies that "Charter's indefiniteness position is a chain of argument ultimately resting on a false equivalence of 'composite SNR-related metric' and 'worst-case SNR profile,'" but "[t]hey are not the same thing." (Dkt. No. 110, at 9.) Plaintiff also submits that "composite metrics based on SNR-related metrics generally (not merely worst-case) are, in fact, disclosed." (*Id.* (citing '682 Patent at 4:40–52).)

At the June 13, 2023 hearing, Defendant argued that Plaintiff does not provide any purported plain meaning for this "composite" term. Defendant submitted that the specification discloses only a "composite worst-case SNR profile." *See* '682 Patent at 4:9–20. Defendant urged that the disputed term is indefinite because the "composite SNR-related metric" cannot be based on the "worst-case SNR profile" if they are both the same thing. Plaintiff responded that "composite" means that something is for more than one cable modem and that a "profile" is something that involves multiple attributes (such as several frequency ranges). Plaintiff concluded that a person of ordinary skill in the art would understand that the term "composite SNR-related metric" relates to multiple cable modems and could be a profile (such as for several different frequency ranges) or could instead be a single composite metric, such as an average.

(b) Analysis

Claim 1 of the '682 Patent recites (emphasis added):

> 1. A method comprising:
> determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a *corresponding signal-to-noise ratio (SNR) related metric*;
> assigning, by said CMTS, each cable modem among a plurality of service groups based on a respective *corresponding SNR-related metric*;
> generating, by said CMTS for each one of said plurality of service groups, *a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics* corresponding to said one of said plurality of service groups;
> selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and
> communicating, by said CMTS, with one or more cable modems corresponding to said one of said plurality of service groups using said selected one or more physical layer communication parameter.

Defendant argues that the specification fails to distinguish between "a composite SNR-related metric" and "a worst-case SNR profile." This argument perhaps may pertain to arguments regarding enablement or written description, but Defendant does not show any lack of reasonable

certainty in the claim language itself. Rather, the claim merely recites a worst-case SNR profile that is based on the SNR-related metrics that correspond to each cable modem, and the composite SNR-related metric, in turn, is based on the worst-case SNR profile. The opinions of Plaintiff's expert are further persuasive in this regard. (*See* Dkt. No. 97, Ex. 7, Apr. 14, 2023 Kramer Decl. at ¶¶ 166 & 168–169; *see, e.g.*, '682 Patent at 4:9–20, 5:7–12 & 5:42–57 & Fig. 2C.) Plaintiff's arguments at the June 13, 2023 hearing (summarized above) are likewise persuasive.

The Court therefore hereby expressly rejects Defendant's indefiniteness argument, and Defendant presents no alternative proposed construction.

The Court accordingly hereby construes **"a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics"** to have its **plain meaning**.

**15. "service group[s]"**

| **"service group[s]"** ('682 Patent) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning. No construction necessary. | A "service group" is the complete set of downstream and upstream channels within a single CMTS that a single cable modem could potentially receive or transmit on. |

(Dkt. No. 84, at A-15; Dkt. No. 97, at 28; Dkt. No. 104, at 28–29; Dkt. No. 115, Ex. A, at 14.)

(a) The Parties' Positions

Plaintiff argues that "[a] 'service group' is a plain English term, and the claim and specification confirm that the groups consist of cable modems (CMs), not *channels*." (Dkt. No. 97, at 28.) "Furthermore," Plaintiff argues, "Charter is attempting to join the upstream and downstream channels without basis in the claim language and contrary to the specification." (*Id.*)

Defendant responds that "[t]he DOCSIS specification itself provides the plain meaning definition of a 'cable modem service group' in the cable television industry (a definition Charter identified in the P.R. 4-3 statement but which Entropic entirely ignores in its brief) . . . ." (Dkt. No. 104, at 29 (citation omitted).)

Plaintiff replies that "[n]othing in the opposition overcomes the central point—the '682 Patent is described in terms of service groups consisting of groups of cable modems (CMs)." (Dkt. No. 110, at 9.) Plaintiff also argues that "whatever DOCSIS might have later said, its use of terms cannot overcome the '682 Patent's usage." (*Id.*, at 10.)

At the June 13, 2023 hearing, the parties submitted this disputed term without oral argument.

(b) Analysis

Claim 1 of the '682 Patent recites (emphasis added):

> 1. A method comprising:
> determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric;
> assigning, by said CMTS, each cable modem among a plurality of *service groups* based on a respective corresponding SNR-related metric;
> generating, by said CMTS for each one of said plurality of *service groups*, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of *service groups*;
> selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with said one of said plurality of *service groups* based on said composite SNR-related metric; and
> communicating, by said CMTS, with one or more cable modems corresponding to said one of said plurality of *service groups* using said selected one or more physical layer communication parameter.

Defendant relies on the following portion of a DOCSIS specification:

> Cable Modem Service Group

> In the HFC plant topology, the complete set of downstream and upstream channels within a single CMTS that a single Cable Modem could potentially receive or transmit on. In most HFC deployments, a CM-SG corresponds to a single Fiber Node. Usually, a CM-SG serves multiple CMs.

(Dkt. No. 104, Ex. 5, *Data-Over-Cable Service Interface Specifications, DOCSIS 3.0*, at 11 (CHARTER_ENTROPIC00101160).)

Because this definition refers to a set of channels that each cable modem can use (rather than a set of cable modems in a system of cable modems), this definition does not inform how the term "service group" is used in the '682 Patent, which refers to grouping cable modems:

> FIGS. 4A and 4B illustrate the network of FIG 1, with different groupings of CMs [(cable modems)] based on one or both of: measured performance metric(s) and location within the HFC network.
>
> * * *
>
> While FIGS. 3A and 3B depict SNR profiles and location as two separate bases on which to assign CMs to service groups, the two may be used in combination.

*See* '682 Patent at 2:24–27 & 6:39–41.

The Court therefore hereby expressly rejects Defendant's proposed construction. No further construction is necessary, particularly in light of the above-noted context provided by the specification. *See U.S. Surgical*, 103 F.3d at 1568; *see also O2 Micro*, 521 F.3d at 1362; *Finjan*, 626 F.3d at 1207; *ActiveVideo*, 694 F.3d at 1326; *Summit 6*, 802 F.3d at 1291; *Bayer*, 989 F.3d at 977–79.

The Court accordingly hereby construes **"service group[s]"** to have its **plain meaning**.

**16. "[communicating with/corresponding to] said one of said plurality of service groups"**

| **"[communicating with/corresponding to] said one of said plurality of service groups"** ('682 Patent, Claim 1) | |
|---|---|
| **Plaintiff's Proposed Construction** | **Defendant's Proposed Construction** |
| Plain and ordinary meaning.<br>No construction necessary. | Indefinite |

(Dkt. No. 84, at A-16; Dkt. No. 97, at 30; Dkt. No. 104, at 30; Dkt. No. 115, Ex. A, at 14–15.)

(a) The Parties' Positions

Plaintiff argues that "Claim 1 itself of the '682 Patent is clear on how service groups, composed of cable modems, and the CMTS communicate . . . ." (Dkt. No. 97, at 30.) Plaintiff also submits that "[t]he specification has a multitude of references to the communication with the service group by way of, for example, physical layer parameters since the invention could not work without communication." (*Id.* (citations omitted).) "Further," Plaintiff argues, "the terms 'communicating,' 'corresponding,' and 'plurality' each have plain English meanings that are well-understood, and the combination of the terms do not create any ambiguity." (*Id.*)

Defendant responds: "There is no antecedent basis for 'said one of said plurality of service groups,' and there is no way to know which one service group among the 'plurality of service groups' the 'communicating' and 'corresponding' steps should be performed on. The claim is therefore indefinite." (Dkt. No. 104, at 30.)

Plaintiff replies:

> The '682 Patent criticizes the folly of lumping all CMs together in a "lowest common denominator" approach. '682 Patent, 5:50–57. Instead, the '682 Patent groups CMs based on their performance (SNR). For each group, the invention can choose communication parameters based on group performance. The chosen parameters are used to communicate with that group. *E.g., id.* at 5:42–50. This is precisely what the claim does. The "generating" step requires creating a composite metric for each service group. The "selecting step" uses the composite metric for

> a particular service group to choose one or more parameter(s) to use with *that* group. The "communicating" step uses the selected parameter(s) to communicate with *that* group.

(Dkt. No. 110, at 10.)

At the June 13, 2023 hearing, the parties submitted this disputed term without oral argument.

(b) Analysis

Claim 1 of the '682 Patent recites (emphasis added):

> 1. A method comprising:
> determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric;
> assigning, by said CMTS, each cable modem among *a plurality of service groups* based on a respective corresponding SNR-related metric;
> generating, by said CMTS for *each one of said plurality of service groups*, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to *said one of said plurality of service groups*;
> selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with *said one of said plurality of service groups* based on said composite SNR-related metric; and
> communicating, by said CMTS, with one or more cable modems corresponding to *said one of said plurality of service groups* using said selected one or more physical layer communication parameter.

The recital of "a plurality of service groups" provides antecedent basis for "said plurality of service groups."

The parties dispute whether the recital of "*each one of* said plurality of service groups" provides antecedent basis for "*said one of* said plurality of service groups."

At first blush, the recital of "*said one* of said plurality of service groups" appears to fail to specify *which* one of the *plurality* of service groups. This is the opinion of Defendant's expert. (Dkt. No. 97, Ex. 8, Apr. 4, 2023 Almeroth Decl. at ¶ 97 ("there is no way to know which one service group among the 'plurality of service groups' is being referred to").)

A fair reading, however, is that "*said one of* said plurality of service groups" refers back to "each *one of* said plurality of service groups." In other words, the steps that refer to "said one of said plurality of service groups" must be performed for each and every one of the plurality of service groups. This is apparent on the face of the claim and is also consistent with Figure 3A of the '682 Patent referring to determining parameters "*per* service group," and the opinion of Plaintiff's expert is further persuasive. (*See* Dkt. No. 97, Ex. 7, Apr. 14, 2023 Kramer Decl. at ¶¶ 176–77.) The contrary opinion of Defendant's expert is unpersuasive. (Dkt. No. 97, Ex. 8, Apr. 4, 2023 Almeroth Decl. at ¶ 97.)

Indeed, the claim recites only *one* "one of said plurality of service groups," so the reference to "said one" is reasonably clear. Thus, to whatever extent this term is deemed to lack *explicit* antecedent basis, the antecedent basis is *implicit*. *See Energizer Holdings Inc. v. Int'l Trade Comm'n*, 435 F.3d 1366, 1371 (Fed. Cir. 2006) (holding that "an anode gel comprised of zinc as the active anode component" provided implicit antecedent basis for "said zinc anode"); *see also Ex Parte Porter*, 25 U.S.P.Q. 2d (BNA) 1144, 1145 (B.P.A.I. 1992) ("The term 'the controlled fluid' . . . finds reasonable antecedent basis in the previously recited 'controlled stream of fluid . . . .'"); *Fisher-Price, Inc. v. Graco Children's Prods.*, No. 05–1258, 154 F. App'x 903, 909 (Fed. Cir. Nov. 4, 2005) ("[a] claim is not invalid for indefiniteness if its antecedent basis is present by implication") (citations omitted). The burden is on Defendant to show a lack of reasonable certainty, and Defendant has not met that burden. *See Nautilus*, 572 U.S. at 910; *see also Sonix*, 844 F.3d at 1377.

The Court therefore hereby expressly rejects Defendant's indefiniteness argument, and Defendant presents no alternative proposed construction.

The Court accordingly hereby construes **"[communicating with/corresponding to] said one of said plurality of service groups"** to have its **plain meaning**.

## X. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms of the patents-in-suit, and as summarized below.

| Disputed Term | The Court's Construction |
|---|---|
| "a data networking engine implemented in a first circuit that includes at least one processor . . ."<br>('775 Patent, Claim 18)<br><br>"a cable modem engine implemented in a second circuit that includes at least one processor . . ."<br>('775 Patent, Claim 18) | Plain meanings. |
| "data bus"<br>('775 Patent, Claim 18) | Plain meaning |
| "wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine"<br>('775 Patent, Claim 18) | "wherein the cable modem engine and the data networking engine are not necessarily physically separate but are functionally separate such that the cable modem functions are performed only by the cable modem engine and the home networking functions are performed only by the data networking engine" |
| "DOCSIS functions"<br>('775 Patent, Claim 19) | Plain meaning. |

| | |
|---|---|
| "DOCSIS MAC processor"<br>('775 Patent, Claim 18)<br><br>"DOCSIS controller"<br>('775 Patent, Claim 18) | Plain meanings. |
| "network management messages"<br>('826 Patent, Claim 1) | "messages which report on the network based on the measured characteristics" |
| "operable to"<br>('008 Patent, Claim 1) | "configured to" |
| "digitize a received signal spanning an entire television spectrum comprising a plurality of television channels"<br>('008 Patent, Claim 1) | Plain meaning. |
| "signal monitor"<br>"data processor"<br>"channelizer"<br>('008 Patent, Claim 1) | Plain meanings. |
| "probe"<br>('690 Patent, Claims 1, 7, 8, 9, 11) | "a signal transmitted to a network node that the network node can compare to a reference signal having a known form in order to determine characteristics of the channel on which the signal was transmitted" |
| "physical layer probe"<br>('690 Patent, Claim 9) | Plain meaning (apart from the Court's construction of "probe," above). |
| "probe request"<br>('690 Patent, Claims 1, 7, 8, 9, 11, 15, 16) | "a request, sent by one network node to another network node, that specifies the form of a probe to be generated and transmitted" |

| | |
|---|---|
| "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters"<br>('690 Patent, Claim 1)<br><br>"wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node"<br>('690 Patent, Claim 9)<br><br>"the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe"<br>('690 Patent, Claim 9) | Plain meanings. |
| "downconverting . . . a plurality of frequencies"<br>('362 Patent, Claim 11) | Plain meaning. |
| Order of Steps<br>('362 Patent, Claim 11) | In Claim 11 of the '362 Patent, the "digitizing . . ." step must be performed before the "selecting . . ." step, and the "selecting . . ." step must be performed before the "outputting . . ." step. No other order of steps is required. |
| "a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics"<br>('682 Patent, Claim 1) | Plain meaning. |
| "service group[s]"<br>('682 Patent) | Plain meaning. |

| | |
|---|---|
| "[communicating with/corresponding to] said one of said plurality of service groups"<br>('682 Patent, Claim 1) | Plain meaning. |

The parties are **ORDERED** that they may not refer, directly or indirectly, to each other's claim construction positions in the presence of the jury. Likewise, the parties are **ORDERED** to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

**So ORDERED and SIGNED this 26th day of June, 2023.**

RODNEY GILSTRAP
UNITED STATES DISTRICT JUDGE

**UNITED STATES DISTRICT COURT**
**FOR THE EASTERN DISTRICT OF TEXAS**
**MARSHALL DIVISION**

ENTROPIC COMMUNICATIONS, LLC,

Plaintiff

v.

CHARTER COMMUNICATIONS, INC.,

Defendant.

Civil Action No. 2:22-cv-00125-JRG

**JURY TRIAL DEMANDED**

# PLAINTIFF'S OPENING CLAIM CONSTRUCTION BRIEF

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## I. INTRODUCTION

Plaintiff Entropic Communications, LLC ("Entropic") brought this case against Defendant Charter Communications, Inc. ("Charter") for the infringement of U.S. Patent Nos. 8,223,775 (the "'775 Patent") (Ex. 1); 8,792,008 (the "'008 Patent") (Ex. 2); 9,825,826 (the "'826 Patent") (Ex. 3); 8,284,690 (the "'690 Patent") (Ex. 4); 9,210,362 (the "'362 Patent") (Ex. 5); and 10,135,682 (the "'682 Patent") (Ex. 6) (collectively, the "Patents-in-Suit").

Consistently throughout, Entropic believes the terms should be given their plain and ordinary meaning as would be understood to a person of ordinary skill in the art ("POSITA") in light of the claims, specification, and prosecution history. Entropic does not seek to import limitations or change the meaning of any of the terms. And this is not a case where a plaintiff seeks to use plain meaning to loosen the claim scope to stretch the patents. The Patents-in-Suit were invented at leading companies in the satellite and cable technology market (Entropic and MaxLinear). The infringement in this case rests squarely in the middle of the claims.

Meanwhile, Charter's positions are quite plainly attempts to win the case via *Markman*. Given the nature of the patents and their provenance, Charter cannot propose reasonable claim construction positions that afford a path to avoiding infringement. This is why nearly half of Charter's positions (seven of the sixteen term groupings) are indefiniteness, and the actual constructions put forth rewrite the claims with new limitations from the specification.

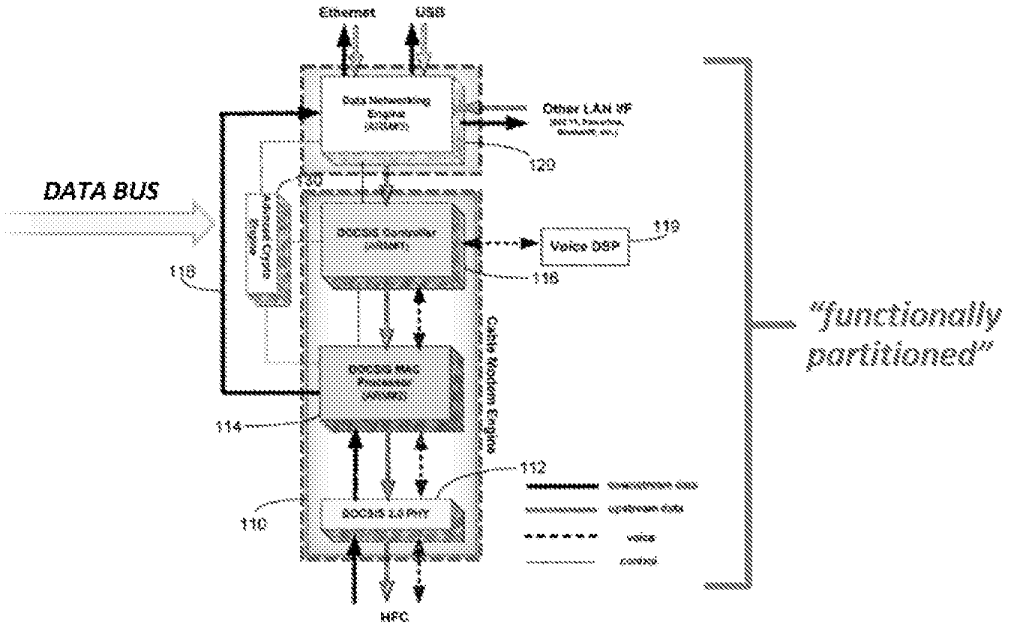
## II. OVERVIEW OF THE PATENTS-IN-SUIT

### A. '775 Patent

The '775 Patent, titled "Architecture for a Flexible and High-Performance Gateway Cable Modem," relates generally to a novel architecture for cable modems. The '775 Patent discloses various embodiments providing a "highly flexible, high performance system capable of handling

multiple cable modem voice, data and networking services" wherein cable modem ***functions*** are "completely partitioned" from data networking ***functions***. *See* '775 Patent, 1:61–2:4. In the disclosed embodiments, this partitioning is accomplished, for example, "by localizing data networking functions in the data networking engine processor and localizing cable modem functions in the cable modem engine processor." *Id.* at 4:16–19.

Fig. 1 of the '775 Patent, below[1], illustrates an exemplary cable modem system architecture, with a data networking engine **120** (blue) and cable modem engine **110** (red), wherein the cable modem engine includes a DOCSIS controller **116** (green), DOCSIS MAC processor **114** (orange), and DOCSIS 2.0 PHY **112** (yellow), and communication path **118** is a data bus that allows for communication between the DOCSIS MAC processor and the data networking engine:



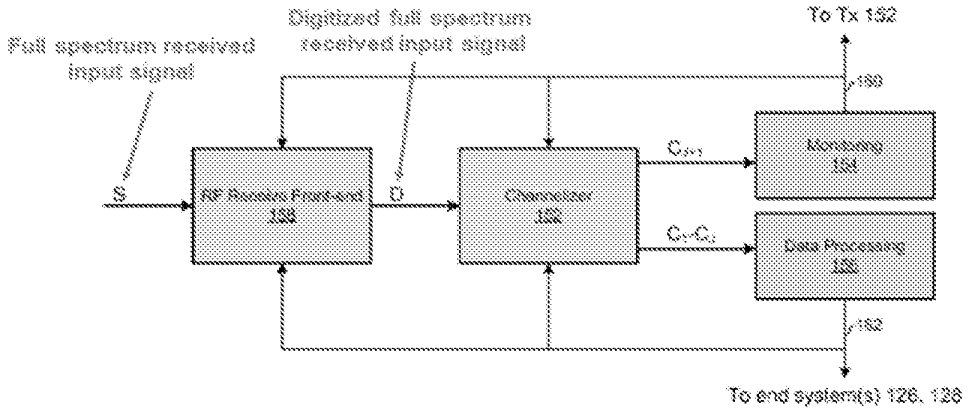

## B. '826 and '008 Patents

The '008 Patent, titled "Method and Apparatus for Spectrum Monitoring," relates generally

[1] All emphasis and annotations added unless otherwise noted.

to methods and apparatuses for monitoring cable or satellite television signals. *See, e.g.*, '008 Patent, Abstract, 2:34–3:4 (cable embodiment), 4:51–5:11 (satellite embodiment). The '826 Patent is a continuation of the '008 Patent and relates to the same subject matter.

The '826 and the'008 Patents disclose methods and apparatuses that can be implemented in Customer Premises Equipment (CPE) that enable the CPE to: receive a cable or satellite television signal, digitize said signal, determine a characteristic of the digitized signal, and then report the determined characteristic back to the source of the signal (*i.e.*, the network-based service providers) without interrupting normal customer service. Specifically, the patents disclose an apparatus that is capable of performing spectrum monitoring. *See, e.g.*, '008 Patent, FIG. 1B. To perform spectrum monitoring without interrupting services, as shown in Fig. 1B below, the '008 Patent discloses a monitoring apparatus capable of (1) receiving and digitizing a full spectrum signal in a front-end **158** (red); (2) selecting specific portions of the outputs of the front-end **158** using a channelizer **152** (blue); (3) concurrently outputting one portion to a monitoring device **154** (green) and another portion to a data processing device **156** (yellow); and (4) sending network maintenance messages based on a characteristic of the received signal.



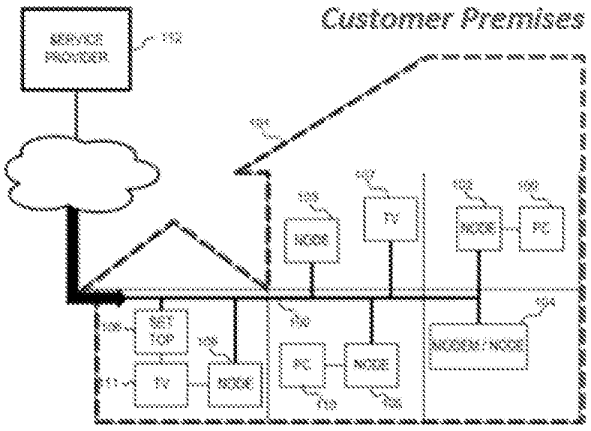

Starting with receiving and digitizing the spectrum, the front-end **158** receives a signal that spans an entire television spectrum. This signal is then digitized using one or more analog-to-

digital converters (ADCs) located in the front-end **158**, which generate a digital signal (D). *See* '008 Patent, 2:44–59, 3:11–16, 4:45–50, 5:45–65. Next, a channelizer selects portions of the digitized signal D to concurrently output to a monitoring module **154** and to a data processor **156**. *See id.* at 4:28–50, 6:19–36; *see also* 3:20–32, FIG. 1C, FIG. 3.

The monitoring module **154** determines a characteristic of the received signal S pertinent to performance of the communication system. *Id.* at 3:5–60; *see also* 5:12–47, 6:19–36, FIG. 1C, FIG. 4. Once this characteristic is determined, the monitoring module then can send network management messages to ensure the quality of the received signal. *See id.* at 3:51–60. Overall, the '008 Patent discloses methods and apparatuses that allow network-based service providers to better monitor their networks by increasing the service providers' ability to remotely monitor CPE.

### C. '690 Patent

The '690 Patent, titled "Receiver Determined Probe," relates generally to aiding in the diagnosis of problems with subscriber services. *See* '690 Patent, 1:31–34. The '690 Patent describes the use of *probes* to "characterize the communication channel over which data is to be sent between nodes of the network." *Id.* at 1:41–43. Exemplary nodes are illustrated in Fig. 1:




'690 Patent, FIG. 1. Nodes are programmed to generate a probe transmission in response to a probe request. *See id.* at 1:66–2:3. The probe request may "specif[y] a plurality of parameters to be used

. . . to generate a probe." *Id.* at 2:3–6. The responsive probe may then comprise a plurality of parameters used for channel assessment, maintenance procedures, and/or off-site network diagnosis. *See id.* at 1:50–51, 2:20–27, 4:25–27.

**D. '362 Patent**

The '362 Patent, titled "Wideband Tuner Architecture," relates generally to a receiver system configured to receive a number of channels across a broad radio frequency (RF) spectrum. *See* '362 Patent, 1:15–18. The receiver contains one or more analog-to-digital converters (ADC's) configured to digitize an incoming analog signal. *Id.* at Abstract, 1:49–51. In certain embodiments, the receiver further comprises one or more mixers configured to downshift the signal, as well as circuitry configured to select and output a number of desired channels. *Id.* at Abstract, 1:45–49.

**E. '682 Patent**

The '682 Patent, titled "Method and System for Service Group Management in a Cable Network," relates generally to organizing cable modems (CMs) into service groups based on signal-to-noise ratio (SNR) related metrics. The '682 Patent describes how a cable modem termination system (CMTS) may "determine, for a plurality of cable modems served by the CMTS, a corresponding plurality of SNR-related metrics." '682 Patent, Abstract. The CMTS may assign cable modems to service groups based on each cable modem's performance on their respective SNR-related metrics. *See id.* at 5:37–39; 8:7–9. The '682 Patent further discloses that the CMTS may build a composite profile for the service group (termed "composite SNR-related metric") based in part on the worst-case SNR of the cable modems within the service group. *Id.* at 4:14–24. This composite SNR-related metric allows the CMTS to select physical layer communication parameters that are most appropriate for the cable modems within a given service group, which in turn may lead to optimized performance for the cable modems. *Id.* at 5:7–20. For example, cable

modems within the same service group may share similar SNR-related metrics, and thus would benefit from similar physical layer parameters, which makes application of the same composite SNR-related metric to the similarly-situated cable modems advantageous. *Id.* at 4:14–17; 5:7–20; 5:40–57.

## III. PERSON OF ORDINARY SKILL IN THE ART

Claim terms are viewed from the perspective of a POSITA. *Lazare Kaplan Int'l v. PhotoScribe Tech's, Inc.*, 628 F.3d 1359, 1368 (Fed. Cir. 2010). Entropic contends a POSITA "would have been an Engineer with at least a Bachelor's Degree in Electrical Engineering (or equivalent), with at least two years of experience developing broadband/cable TV/satellite communication systems and solutions." Ex. 7, Kramer Decl. ¶ 49.

## IV. CONSTRUCTION OF TERMS

### A. '775 Patent

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "a data networking engine implemented in a first circuit that includes at least one processor . . ." (cl. 18) | Plain and ordinary meaning. No construction necessary. | Indefinite. |
| "a cable modem engine implemented in a second circuit that includes at least one processor. . ." (cl. 18) | Plain and ordinary meaning. No construction necessary. | Indefinite. |

The Court should construe these according to their plain and ordinary meaning because:

- The claim language uses standard engineering terms (*e.g.*, circuit and processor), which Charter and its expert admit were well-known.
- The specification explicitly describes two separate engines, each comprising circuitry including one or more processors, each handling "data networking" and "cable modem" functions, respectively.
- This Court has previously found similar "circuit" claim language not to be indefinite.

By the time of the '775 Patent, "cable modems" and "data networks" were ubiquitous terms known to both POSITAs and lay people. Kramer Decl. ¶ 84. Likewise, "engine" is used

generically—modified by the words "cable modem" and "data networking"—describing the components that drive the data networking and cable modem functionality, respectively. *See id.*

Charter's own expert, Dr. Kevin Almeroth, relies on a dictionary definition which actually confirms the point. Circuits are "[a] combination of electrical components interconnected ***to perform a particular task***." Ex. 8, Almeroth Decl. ¶ 65 (citing Appx. C at 99); *see also* Kramer Decl. ¶¶ 83, 88. Furthermore, a POSITA would have no trouble understanding the meaning of a circuit including a processor—itself a well-known term—that performs specific functions. *See e.g. Biax Corp. v. Sun Microsystems, Inc.*, 2:06-cv-364 (E.D. Tex. Jul. 18, 2008) (construing "a first circuit" to mean "an assemblage of electronic elements"); *see also Linear Technology Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1320 (Fed. Cir. 2004) ("when the structure-connoting term 'circuit' is coupled with a description of the circuit's operation, sufficient structural meaning generally will be conveyed to [POSITAs]"). The disputed claim language recites common terminology familiar to ordinary artisans and lay people. It requires no construction.

The specification accords with the plain meaning. The two claimed "engines" are disclosed as components of the overall system, with each engine responsible for the "cable modem" and "data networking" functions respectively. A POSITA would have recognized the '775 Patent teaches that "first" and "second" circuits in the two engines are separated by the functions that the circuits perform. *See e.g. id.* at 4:13–16 ("Functional Partitioning. Cable modem **100** completely partitions data networking functions . . . from DOCSIS cable modem functionality."). That is, the first circuit performs data networking functions, and the second circuit performs cable modem functions. *See* Kramer Decl. ¶ 84; *see also* '775 Patent, FIGS. 1 and 2 (showing clearly delineated data networking engine ("DNE") **120** and cable modem engine ("CME") **110**).

Charter seems to argue that a POSITA could not understand how to distinguish between

different components (*e.g.*, circuits) in an integrated system, and this alleged problem is so bad that it invalidates the claim. That position defies common sense. It ignores that electrical engineers routinely design subcomponents of consumer electronics, even if the components reside on the same chip—that is exactly what System-on-Chips (SoCs) are all about. This was understood at the filing date: consumer electronics routinely were a patchwork of "circuits"—often from different sources—assembled together. *See* Kramer Decl. ¶¶ 83–84. As Entropic's expert Dr. Richard Kramer explains, a POSITA would have been familiar with systems-on-chip (SoCs) and application-specific integrated circuits (ASICs) (*i.e.*, "chips") when considering the disputed claim language. *Id.*, ¶ 84. This too is what the '775 Patent discusses: "A chip implementing cable modem system **100** [the overall system including both engines] will have only a small incremental hardware cost/functional increase over current stand-alone cable modem chips." '775 Patent, 4:58–60. A POSITA would have no trouble determining where one circuit begins and another ends, because integrating functional blocks on "a chip" does not render them indistinguishable.

This Court previously found no ambiguity in claim language reciting "first" and "third" circuits and having claim structure analogous to the claims at issue in the present case. In *Realtime Data, LLC v. Rackspace US, Inc.*, the claims recited four distinct circuits, including: "a first circuit configured to analyze a plurality of data blocks to recognize when an appropriate content independent compression algorithm is to be applied to the plurality of data blocks" and "a third circuit configured to analyze a data block from another portion of the plurality of data blocks for recognition of any characteristic, attribute, or parameter that is indicative of an appropriate content dependent algorithm to apply to the data block." No. 6:16-cv-00961-RWS-JDL, 2017 WL 2590195, at *12 (E.D. Tex. June 14, 2017). This Court rejected an indefiniteness challenge, finding the terms not indefinite and not in need of construction.

In *Realtime Data*, as here, "a [POSITA] would read the operations provided for each circuit and understand what potential electronic components could perform those operations." *Id.* at *14–15. This is evident when reading the claim elements as a whole, and not just the introductory language: "the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment" and "the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine." '775 Patent, cl. 18. A POSITA would understand the operations of the claimed engines (incorporating circuits and one or more processors) in view of the entire claim element, and would be familiar with electronic components for performing those operations. *See* Kramer Decl. ¶ 84.

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "data bus" (cl. 18) | Plain and ordinary meaning. No construction necessary. | Indefinite. |

The Court should construe this term according to its plain and ordinary meaning because:

- The meaning of "data bus" is well-known to a POSITA, as confirmed by the intrinsic and extrinsic evidence.

Charter and its expert do not dispute that a data bus would have been easily understood by a POSITA. *See* Ex. 9, Almeroth Tr. at 113:11–14; *see also* Ex. 10, IEEE dictionary ("data bus" is "a bus used to communicate data to and from a processing unit or a storage device."). Dr. Kramer agrees. Kramer Decl. ¶¶ 101–102. With nothing more, Charter cannot meet its burden to demonstrate the term is indefinite, and no construction is necessary.

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine" (cl. 18) | Plain and ordinary meaning. No construction necessary. | The cable modem engine and the data networking engine do not share any connecting circuitry, data paths, or memory devices. |

The Court should reject Charter's proposed construction and construe this term according to its plain and ordinary meaning because:

- The '775 Patent discloses and claims partitioning in terms of "***Functional Partitioning***."
- Connecting the two engines (*i.e.*, by a data bus) does not destroy partition of functionality.
- Connecting the two engines is essential to the invention and to the claim itself. The claim requires a portion of the Cable Modem Engine ("CME")—namely the DOCSIS MAC processor—to pass data directly to the Data Networking Engine ("DNE").

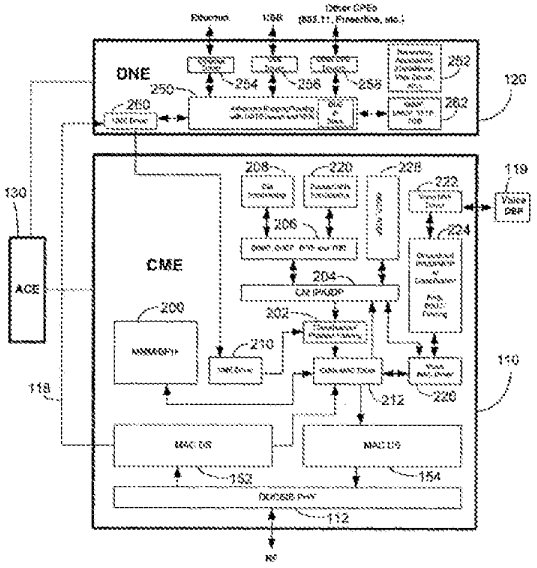
The disputed claim language explicitly recites that the ***functions*** of the DNE and CME are partitioned. This distinction is key because functions can be partitioned in hardware, software, or both. *See* Kramer Decl. ¶ 102. Functional partitioning is explicitly described in the specification as "localizing" the cable modem and data networking functions in the separate engines:

> ***Functional Partitioning***. Cable modem **100** completely partitions data networking ***functions*** (advanced bridging/routing, NAT/firewall, VPN, web server and CableHome applications) from DOCSIS cable modem functionality. This is accomplished by localizing data networking ***functions*** in the data networking engine processor and localizing cable modem ***functions*** in the cable modem engine processor.

'775 Patent, 4:13–19. A POSITA would understand that connecting the DNE and CME (*e.g.*, via a data bus) does not eliminate the compartmentalization of their respective functions. *Supra* 2; *see also* Kramer Decl. ¶ 102.

On the contrary, such a connection is required by the claims. Claim 18 requires the Cable Modem Engine (CME) be "configured to process downstream PDU packets and ***forward the processed packets directly*** to the [Data Networking Engine (DNE)]." Charter's definition forbidding any connection between the two engines cannot be correct. Without such a connection,

the claim language makes no sense. To say that this violates a variety of claim construction principles is an understatement. *See generally MySpace, Inc. v. GraphOn Corp.*, 672 F.3d 1250, 1256 (Fed. Cir. 2012) ("proper claim construction requires that we understand what the invention encompasses as well as how the claims are stated"); *Exxon Chem. Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1557 (Fed. Cir. 1995) (must give meaning to all the words in a claim). The obvious and correct interpretation is that each engine carries out its respective functions, but they can communicate with one another. This is precisely what is disclosed by the '775 Patent, for example, connection **118** between the CME and DNE:




'775 Patent, FIG. 2 (showing partitioned CME and DNE connected by data path **118** highlighted in yellow). *See also, e.g.*, FIG. 1, 3:15–17 ("DS PDU packets are forwarded by [the DOCSIS MAC processor] directly to [DNE] **120** along path **118**, bypassing controller **116**").

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "DOCSIS functions" (cl. 19) | Plain and ordinary meaning. No construction necessary. | This limitation does not change the scope of claim 18 |

The Court should construe this term according to its plain and ordinary meaning because:

- All elements of the claim are presumed to have meaning.

- Charter's proposed construction violates the doctrine of claim differentiation.

Claim 18 states that the CME comprises a processor, programmed with software, that when executed causes the CME to perform "cable modem functions other than the home networking functions performed by the [DNE]." Dependent claim 19 increases the burden on the CME—"***all*** DOCSIS functions are localized in the [CME]." Logically, claim 18 does not require that each and every DOCSIS function be executed by the circuitry of the CME, while claim 19 does.

Charter is wrong as a matter of law because the Federal Circuit has repeatedly held that the Court must give meaning to all the words in a claim. *Exxon Chem. Patents*, 64 F.3d at 1557. Not only does Charter's proposed construction ignore the plain language of claim 18; it also violates the doctrine of claim differentiation by rendering claim 19 superfluous. *See Comark Comm'cns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (recognizing "a presumption that each claim in a patent has a different scope").

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "DOCSIS MAC processor" (cl. 18) | Plain and ordinary meaning. No construction necessary. | The DOCSIS MAC processor exactly as described in the patent specification (*see, e.g.*, '775 Patent, at 3:1-20; 4:41-57; *id.*, at Figures 1 & 2). Otherwise indefinite. |
| "DOCSIS controller" (cl. 18) | Plain and ordinary meaning. No construction necessary. | The DOCSIS controller exactly as described in the patent specification (*see, e.g.*, '775 Patent, at 3:21-48; 4:41-57; *id.*, at Figures 1 & 2). Otherwise indefinite. |

The Court should reject the limitation sought by Charter's proposed construction and apply the plain and ordinary meaning because:

- Charter's proposed construction improperly limits the claim to specific ***exemplary*** embodiments described in the specification.
- Charter has already agreed that this term is not a means-plus-function term (35 U.S.C. § 112(6)), but proposes to construe the term as such.

The Federal Circuit and this Court have held that the terms "processor" and "controller" denote known classes of structures—generally understood to POSITAs. *See e.g. Smartflash LLC*

*v. Apple Inc.*, 77 F. Supp. 3d 535, 541 (E.D. Tex. 2014) ("'processor' . . . describes a class of structures") (citing *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1300); *see also Barkan Wireless IP Holdings v. Samsung Electronics Co.*, 2:18-cv-28, 2019 WL 497902, *22 (E.D. Tex. Feb. 7, 2019) ("no persuasive evidence that the term 'controller' fails to connote structure in the relevant art"). Likewise, there is no dispute that "DOCSIS" (Data Over Cable Service Interface Specification) and "DOCSIS MAC" (Medium Access Control) were established standards known to POSITAs as of the priority date. *See e.g.*, Kramer Decl. ¶ 84. *Phillips* counsels that the Court's claim construction analysis stops there absent a "clear disavowal" (which is not alleged here). *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1320 (Fed. Cir. 2005).

Charter commits the "cardinal sin" of claim construction by improperly seeking to limit claim 18 to particular embodiments described in the specification (*e.g.* '775 Patent, 3:1–48, 4:41–57). *See Teleflex, Inc. v. Ficosa North America Corp.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002). The specification plainly states these are merely ***exemplary*** implementations. *See e.g.* '775 Patent, 3:17–19 ("***In one implementation***, processor **114** is an ARM9TDMI-based RISC processor"), 3:24–25 ("***In one implementation***, controller **116** is an ARM940-based RISC processor"); *see also* Ex. 9, Almeroth Tr. at 109:10–110:8 (admitting these are exemplary implementations). In fact, claim 12, which depends from claim 1 and has the same language of claim 18 ("DOCSIS MAC processor" and "DOCSIS controller"), explicitly recites "wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor." Thus, the same terms in claim 1 would not be limited as Charter suggests, per claim differentiation, and there is no reason not to apply the same definition to claim 18. *See Comark*, 156 F.3d at 1187. Indeed, at the time of the invention, a POSITA would have recognized that ARM-based processors were common and that many other types of processors were readily

available, and they would have seen no reason to limit the claims to the specific ARM-based processors disclosed in the specification. *See* Kramer Decl. ¶ 98.

Moreover, the specification confirms that a POSITA would understand "DOCSIS MAC processor" and "DOCSIS controller" as referring to portions of the CME corresponding respectively to the functions of MAC processing for DOCSIS and controlling DOCSIS functions. *See* '775 Patent, 3:1–7 (the DOCSIS MAC processor "implements real-time critical MAC functions for both upstream (US) and downstream (DS) communications . . . includ[ing] US and DS synchronization, DS MAC address filtering, DS protocol filtering, US and DS PHS, concatenation, fragmentation, MAP processing, US transmission scheduling, as well as DOCSIS link-layer DES encryption and decryption."), 3:27–38 (describing how the DOCSIS controller implements DOCSIS functions such as MAC management message (MMM) processing, IGMP, MAC address learning, classification, US protocol filtering, CM IP stack and software downloading, cable modem IP/UDP functions, SNMP, DHCP, TFTP, and TOD functionality, and cable modem provisioning); *see also* Kramer Decl. ¶¶ 92–93.

Charter's construction is an attempt to obtain a means-plus-function construction, while avoiding the high legal hurdles to invoking § 112(6). This Court has repeatedly rejected attempts to limit "processor" elements to 112(6). *See generally Smartflash LLC v. Apple Inc.*, 77 F. Supp. 3d 535, 541 (E.D. Tex. 2014); *see also Realtime Data*, 2017 WL 2590195 at *17 (taking note of "the numerous precedent from this District finding the term 'processor' is not a [MPF] term"). Charter steadfastly maintains it is not seeking MPF construction. *See* Ex. 11, Email from A. Boardman ("Charter still does not contend that any proposed term is governed by 35 U.S.C. § 112(6)"). Yet the proposed construction is precisely that which would be yielded by MPF analysis—Charter limits the term to the processor models "***exactly as described***" in the

specification and requires the CME to have two processors when the claim only requires one. The Court should reject Charter's effort to make an end run around controlling precedent.

**B. '826 Patent**

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "network management messages" (cls. 1, 2) | Plain and ordinary meaning. No construction necessary. | Messages which report on the status of the network based on an analysis of the measured characteristic. |

The Court should construe this term according to its plain and ordinary meaning because "network management message" is a plain English phrase that means exactly what it says. The '826 Patent's specification confirms the phrase is meant to convey all its ordinary possibilities, in disclosing a list of exemplary types/uses of the messages. *See e.g.*, '826 Patent, 3:63–4:2 (numbers added for reference): "Such messages ***may*** comprise, ***for example***, network status updates **[1]** indicating whether one or more communication parameters of one or more received television or DOCSIS channels are outside acceptable bounds, and/or **[2]** conveying measured/determined characteristics back to a source of the received signal (*e.g.*, back to a cable headend)." Such messages may be used, "***in an example embodiment***, [to] adjust transmission parameters (*e.g.*, modulation parameters, transmit power, frequency offsets, *etc.*)" as well as generically to "perform other maintenance/management based on the received messages." *Id.* at 3:11–15.

Charter is attempting to construe the phrase to exclude one of the explicitly stated message types, namely messages **[2]** "conveying measured/determined characteristics." *Id.* at 3:67–4:1. This is a bold and improper attempt to limit the claim that flies directly in the face of the disclosure.

Moreover, a different portion of claim 1 already recites: "controlling the transmission of network management messages back to said headend ***based on said measured characteristic of said received signal***." As such, there are only two possibilities. Charter's construction either (1) confusingly imports one element into another, or (2) is a clever attempt to narrow the claim from

"***based on*** said measured characteristic," to Charter's "an ***analysis*** of the measured characteristic." Both are improper, further counseling for a rejection of Charter's recasting of the plain English phrase into far more words.

### C. '008 Patent

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "operable to" (cl. 1) | Plain and ordinary meaning. No construction necessary. | Configured to. |

Entropic is unsure how rephrasing this simple phrase will assist the jury, because it is unknown what distinction Charter seeks to introduce between the claim language and its proposal. There may be no dispute, but given the lack of detail Charter provided regarding its position, Entropic will respond to Charter's position once Charter clarifies the basis for its proposal.

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "digitize a received signal spanning an entire television spectrum comprising a plurality of television channels" (cl. 1) | Plain and ordinary meaning. No construction necessary. | The "received signal" contains only television channels. |

The Court should reject Charter's effort to limit this term to television channels and construe this term according to its plain and ordinary meaning because:

- The claim language "comprising" is not ambiguous—the "received signal" is permitted to include other signal components in addition to the television channels.

Charter's proposal rewrites the claim. The plain language of the claim recites "***comprising*** a plurality of television channels," indicating that the "received signal spanning an entire television spectrum" is ***not limited*** to only television channels. The spectrum contains TV channels, but it may contain additional material. *See Georgia-Pacific Corp. v. US Gypsum Co.*, 195 F.3d 1322, 1327 ("The transitional term 'comprising' . . . is open-ended and does not exclude additional, unrecited elements or method steps"). Indeed, the specification confirms that the received signal may comprise other kinds of information, such as data via the IP network and one or more DOCSIS

channels. '008 Patent, 2:44–54. Nor does anything in the specification indicate that "television spectrum" should be limited to ***only*** "television channels." *See id.* at 3:12–16 ("The signal S may be the result of a plurality of ***television and/or DOCSIS channels*** being frequency division multiplexed into a single signal."), 4:45–47 ("The data processing module **156** may process one or more of bands $C_1$–$C_J$ to recover data on one or more channels (*e.g.*, ***television and/or DOCSIS channels***)"), 5:60–62 ("Accordingly, for cable television/DOCSIS, the ADC **256** may be operable to digitize the entire cable downstream (*e.g.*, from ~55 MHz to ~1002 MHz).").

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "signal monitor," "data processor," "channelizer" (cl. 1) | Plain and ordinary meaning. No construction necessary. | Three separate pieces of hardware configured to perform the functions the claim ascribes to the signal monitor, data processor, and channelizer, respectively. |

The Court should construe these according to their plain and ordinary meaning because:

- There is no anchor anywhere in the claim language for a "separateness" requirement.
- The specification teaches the opposite—the signal monitor, data processer, and channelizer are expressly not required to be "three separate pieces of hardware."

Charter wholesale invents a new limitation for claim 1—requiring the signal monitor, data processor, and channelizer to be "three separate pieces of hardware." However, the plain language of claim 1 does not support such a requirement. No phrase even arguably related to separateness is present. Indeed, the specification is clear that these three items do ***not*** have to be implemented on separate pieces of hardware. Subassembly **174** includes all three items: the signal monitor **154**, data processor **156**, and channelizer **152**. *See id.* at FIG. 1C. The '008 Patent then states: "[t]he various modules of the subassembly **174** may reside in . . . ***one or more*** integrated circuits." *Id.* at 4:56–59. "One or more" plainly includes "one," thus destroying any notion that the three claim elements must be implemented on "separate pieces of hardware."

**D. '690 Patent**

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "probe" (cls. 1, 7) | Plain and ordinary meaning. No construction necessary. | A packet transmitted to a network node which the node compares to a reference packet having a known form in order to determine characteristics of the channel on which the packet was transmitted. |
| "physical layer probe" (cls. 9, 11) | Plain and ordinary meaning. No construction necessary. | Physical layer probe means probe. Otherwise indefinite. |

The Court should construe these according to their plain and ordinary meaning because:

- "Probe" and "physical layer probe" are different claim elements, presumed to have different meanings.
- There is no intrinsic support for requiring the probe to be "compare[d] to a ***reference packet*** having a known form in order to determine characteristics of the channel on which the packet was transmitted."

Beginning with the plain language of the claims, it is apparent there is a distinction between "probe[s]" and "physical layer probe[s]." The term "probe" is broader and is not limited to the physical layer. Entropic's technical tutorial, at slide 18, provides a visual representation of the extremely common OSI model and its layers. The physical layer (PHY) is just ***one*** of ***seven*** layers. *See* Entropic's Technical Tutorial, submitted on May 9, 2023, at Slide 18; *see also* Ex. F to Almeroth Decl. at [0009] ("In cable modems adhering to the well-known OSI reference model, the lowest layer is the Physical layer (PHY), while the next layer up is the Data Link layer."). Charter's proposed construction—whereby "physical layer probe" simply means "probe"—therefore fails to give meaning to all the words of the claim. *See e.g. Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.").

Additionally, Charter's proposed construction imposes on "probe" a lengthy requirement of a specific function, in clear violation of the rule against importing the specification into the claim. *See e.g. Teleflex, Inc. v. Ficosa North America Corp.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002).

The specification describes how the receiver determined probes may be used in a variety of applications, and identifies several exemplary embodiments. *See* '690 Patent, 2:20–27, 6:59–7:11. Not only are these clearly characterized as exemplary embodiments; there is no indication that these embodiments require comparing with a "reference packet." Notably, the term "reference packet" appears nowhere in the specification. Entropic awaits Charter's explanation for its construction of this phrase to more meaningfully address it, if necessary.

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "probe request" (cls. 1, 7, 8, 9, 11, 15, 16) | Plain and ordinary meaning. No construction necessary. | A request sent by a first network node to a second network node which defines the form of a probe to be generated and transmitted by the second network node. The probe request specifies at least the content payload of the probe. |

The Court should construe this term according to its plain and ordinary meaning because:

- Charter's proposed construction is needlessly complex and incorporates language already appearing in the claims.
- The use of "first network node" and "second network node" in Charter's proposed construction is potentially confusing because the claims also recite "first" and "second node[s]," but these do not necessarily correlate to what Charter calls the "first" and "second network node."

The plain language of the claims confirms that "probe request" means exactly what it sounds like—a request for a probe. *See e.g.* '690 Patent, cl. 1 ("receiving in a first node, a probe request specifying a first plurality of parameters associated with the generation and transmission of a probe"). Although it is difficult to divine Charter's thought process, the proposed 42-word construction seems to incorporate limitations haphazardly from various independent claims and amalgamate them. This is illustrated in the chart below.

| Charter's proposed wording | Source in various claims? |
|---|---|
| "which defines the form of a probe to be generated and transmitted" | Claim 1 – "generating the probe . . . wherein the probe has a form dictated by the first plurality of parameters"<br>Claim 9 – "the first plurality of probe parameters comprising a form for the probe" |

| Charter's proposed wording | Source in various claims? |
|---|---|
| "The probe request specifies at least the content payload of the probe" | Claim 1 – "the first plurality of parameters at least specify content payload of the probe"<br>Claim 17 – "the first plurality of probe parameters comprising at least a payload content for the probe" |
| "A request sent by a first network node to a second network node" | Claim 9 – "a first node transmitting a probe request to a second node" |

Charter's approach is flawed for two reasons. First, it would result in "[c]onstruing a claim term to include features of that term already recited in the claims"—something the Federal Circuit has cautioned against. *See Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1237 (Fed. Cir. 2016). Second, it adds limitations in places where the patent applicant clearly did not intend. For example, claims 1 and 17 expressly recite a "content payload [of/for] the probe," ***but claim 9 does not***. *See Seven Networks, LLC v. Apple Inc.*, 2:19-cv-115 (E.D. Tex. Mar. 31, 2020) (noting that the separate recital of a limitation suggests that if the patentee had intended to include that limitation, "the patentee would have said so").

Finally, Charter's proposed construction introduces confusion because it confuses which node sends and which receives. Charter requires the probe request to be sent "***by*** a first network node to a second network node." However, in claim 1 the "first node" is the ***receiver***, not the sender, of the request. '690 Patent, cl. 1 ("receiving in a first node, a probe request"). Moreover, claim 1 is open-ended as to which node sends the request. *Compare id.*, cl. 1 with cl. 6 ("The method of claim 1, wherein the probe request is generated by the second node."); *see also* '690 Patent, 7:12–13 ("In other embodiments, the probe request might be transmitted by a different node than the probe receiver"); *see also* Ex. 9, Almeroth Tr. at 125:11–126:19 (confirming this is the case). Charter's proposed construction is incorrect and will confuse the jury.

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters" ('690 Patent, cl. 1) | Plain and ordinary meaning. No construction necessary. | Indefinite. |
| "wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node" ('690 Patent, cl. 9) | Plain and ordinary meaning. No construction necessary. | Indefinite. |
| "the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe" ('690 Patent, cl. 9) | Plain and ordinary meaning. No construction necessary. | Indefinite. |

These terms are not indefinite, and the Court should construe these according to their plain and ordinary meaning because:

- There is no ambiguity or inconsistency between the use of these terms in the claims.
- A POSITA would understand there are two sets of parameters—one set which relates to the probe's ***form***, and another set relating to any characteristic of the probe.

The plain and ordinary meaning of these terms would be evident to a POSITA, and nothing implicates such ambiguity as to meet the high legal bar of indefiniteness. The key point is a simple one of linguistic logic. Not all probe parameters specify a ***form***. Probe parameters might instead relate to other characteristics of the probe. Yet all such parameters—whether they underlie the probe's form or otherwise—nonetheless may have a say in the probe's generation. In these claims, the second set—the "second plurality"—does, because the claim states the probe is generated in accordance with the parameters. Thus, the structure of claims 1 and 9 make perfect sense. Beginning with claim 1, the node generates a probe "in accordance with" two pluralities of parameters. The first plurality dictates a form of the generated probe. Meanwhile, the second plurality affects any other characteristic. *See* '690 Patent, cl. 1; *see also* Kramer Decl. ¶ 133 ("A POSITA would understand that what the claim requires is that parameters are specified in the probe request, and at least one of these parameters (*i.e.*, the first plurality) dictates a form of the

probe. A POSITA would understand that the other parameters (*i.e.*, the second plurality and any additional parameters) need not specify a form of the probe.").

Likewise, claim 9 recites a structure like claim 1. There are two pluralities of parameters. The probe must be "generated in accordance with" both. Claim 9 then specifies that the first plurality of parameters comprises at least a "form" for the probe, and more specifically a "modulation profile." As with claim 1, the second plurality is present for any purpose, not merely form. The specification confirms the POSITA's understanding that not all parameters necessarily relate to "a form" of the probe. *See id.* at ¶¶ 136–138. The specification of the '690 Patent identifies several exemplary parameters that can be used to generate a probe. *See* '690 Patent, 2:3–19; *see also id.* at 3:8–11 ("FIG. 5 illustrates examples of parameters that may be modified or determined for generating a probe request according to an embodiment of the disclosed method and apparatus"). Moreover, a POSITA would understand that the point of the probe request is for a node to generate a probe containing responsive information. Kramer Decl. ¶ 138. A POSITA would therefore understand that the ***determined*** "second plurality of parameters" could include such responsive information. *Id.* These would be parameters that are returned in the payload of the probe but which do not necessarily relate to a ***form*** of the probe. *Id.* There is no ambiguity here, and therefore Entropic awaits Charter's explanation of how the language is clearly and convincingly indefinite.

### E. '362 Patent

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "downconverting . . . a plurality of frequencies" (cl. 11) | Plain and ordinary meaning. No construction necessary. | Downconverting a plurality of frequencies of an analog radio frequency (RF) signal. |

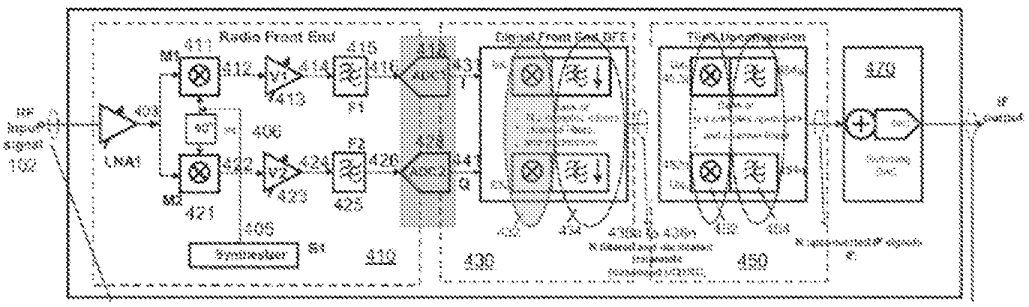
The Court should construe this term according to its plain and ordinary meaning because:

- Charter improperly limits the claim to downconverting ***only analog*** signals, excluding

digital downconversion altogether.

- The plain language imposes no analog-only requirement.
- The specification clearly describes examples of downconverting in the digital domain.

The issue here is analog vs. digital. There seems to be general agreement that downconverting is well-understood. The process brings "down" the frequency of a signal, using a "mixer" or a "mixing" process. The '362 Patent plainly discloses that this mixing, and thus downconversion, may be accomplished on either analog signals or their digital versions. It is easy to tell because the signal passes through an analog-to-digital converter (ADC). If mixing occurs ***before*** the ADC, it is being performed on an analog signal. If performed ***after*** the ADC, it is digital mixing performed on the digital signal. Fig. 4 of the '362 Patent clearly discloses mixing/downconversion of a digital signal, by mixers **432** (blue) operating ***after*** ADC's **418** and **428** (red):



'362 Patent, FIG. 4. Thus, the "mixers" **432** are downcoverting a digital signal. *See id.* 7:13–27.

There is also no support in the specification for limiting the plurality of frequencies to an analog ***radio frequency (RF)*** signal. In fact, the specification refers to the "downconverting" functionality via the above-mentioned "mixer" or "mixer modules" synonymously as "down-shifting" and/or "down-mixing," and does not require that such down-shifting or down-mixing involve only radio signals. *See id.* at 2:45–49. Thus, the specification clearly teaches that it is possible for the plurality of frequencies to be a digital signal, which directly conflicts with Charter's proposed construction.

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| order of the steps (cl. 11) | Plain and ordinary meaning. No construction necessary. | Claimed steps must be performed in the order recited in the claim. |

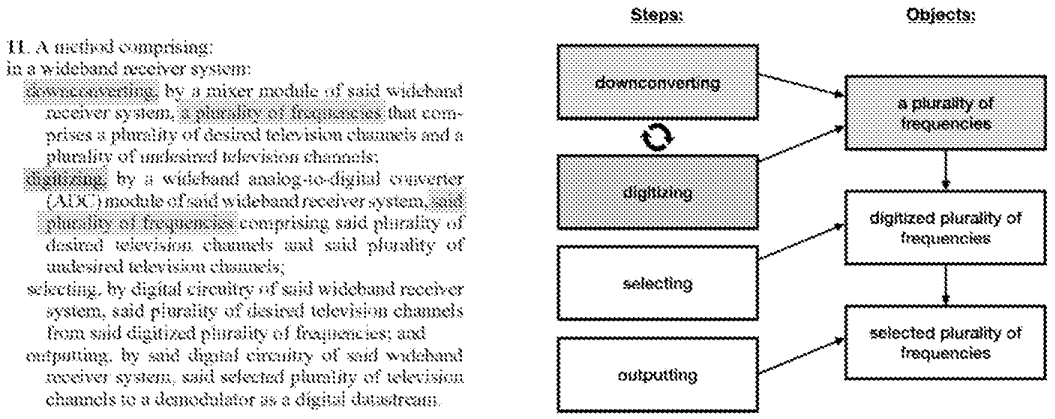
Claim 11 of the '362 Patent recites four steps including "downconverting," "digitizing," "selecting," and "outputting." The Court should construe the order of these steps according to its plain and ordinary meaning, including that the steps may be performed in any order because:

- The default rule of claim construction is that method steps may be performed in any order.
- The first two elements perform operations on the same grammatical object: "a plurality of frequencies…"
- Because the digitizing step does not refer to the output of the "downconverting" step (but rather its input), the claim itself requires no particular order of those steps.

As a preliminary matter, the general rule of claim construction is that method steps may be performed in any order as long as the claim does not require a specific order. *See Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1342–43 (Fed. Cir. 2001) ("[N]othing in the claim or the specification directly or implicitly requires" the claim be performed in the order written.) The steps may only be construed to require an order if the method steps ***require*** that they be performed in the order written. *See id.*; *see also, Baldwin Graphic Systems, Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1345 (Fed. Cir. 2008) ("[A]lthough a method claim necessarily recites the steps of the method in a particular order, as a general rule the claim is not limited to performance of the steps in the order recited, unless the claim explicitly or implicitly requires a specific order."). Where a question arises as to the order of the steps, courts use a two-part test: first, the court looks to the claim language itself to determine if, as a matter of logic or grammar, they must be performed in the order written; and second, the court looks to the specification to determine whether it directly or implicitly requires a narrow construction. *See Gift Express*, 256 F.3d at 134; *see also, Altiris v. Symantec Corp.*, 318 F.3d 1363, 1369–70 (Fed. Cir. 2003).

*First*, nothing in the claim language itself requires that the steps be performed in the order

written. The first two claim elements, the steps of "downconverting" and "digitizing," perform operations on the same grammatical object: "a plurality of frequencies…" (see diagram below):




There is no grammatical or logical reason why digitizing cannot occur before downconverting or *vice versa* since claim 11 states these steps are performed on the same object—the "plurality of frequencies." Nothing occurs in the "digitizing" step that would interfere with downconverting afterward; nor does anything in the "digitizing" step occur that requires downconverting as a predicate. As such, nothing in the claim language itself logically or grammatically requires that the steps be read in the same order.

*Second*, turning from the claim language to the specification, not only does the specification not require an order, it describes different orders in exemplary embodiments. As noted in the section above discussing the disputed term "downconverting . . . a plurality of frequencies," the specification clearly contemplates that digitizing could occur ***before*** downconverting. *See, e.g.*, '362 Patent, FIG. 4, 7:13–27. Specifically, Fig. 4 shows an exemplary embodiment wherein the analog-to-digital converter performing the digitizing could come ***before*** the mixer performing the downconverting. *See id.* Viewed in light of the differently ordered embodiments disclosed in the specification, Charter's request for an order of the steps limitation is nothing more than a second attempt by Charter to require that the claimed downconverting is

done on an analog signal only. As such, for the same reasons that the "downconverting . . . a plurality of frequencies" claim term should be construed according to its plain and ordinary meaning, the order of the steps should not be required to be performed in the order recited.

**F. '682 Patent**

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics [corresponding to said one of said plurality of service groups]" (cl. 1) | Plain and ordinary meaning. No construction necessary. | Indefinite. |

The Court should construe this term according to its plain and ordinary meaning because:

- Given the specification, Charter cannot carry the burden of establishing indefiniteness.

Any POSITA familiar with hybrid fiber coaxial ("HFC") networks understands what is meant by an SNR profile and SNR-related metrics. *See* Kramer Decl. ¶¶ 166, 172. Further, the adjectives "worst-case" and "composite" have plain meanings to a POSITA. *See id.* The specification confirms the claim terms are used in accord with a POSITA's expectations.

*First*, take an SNR-related metric. The specification confirms that SNR means "signal-to-noise-ratio" and discusses SNR profiles and SNR-related metrics (*i.e.*, metrics related to SNR) and their usage in grouping cable modems together. *See, e.g.*, '682 Patent, 3:53–63, Abstract ("A cable modem termination system (CMTS) may determine, for a plurality of cable modems served by the CMTS, a corresponding plurality of SNR-related metrics. The CMTS may assigning [sic] the cable modems among a plurality of service groups based on the SNR-related metrics.").

*Second*, the specification describes SNR profiles as the profile of "signal-to-noise ratio (SNR) versus frequency" ('682 Patent, 2:15–17) and illustrates examples in Figs. 2B and 2C (*id.* at 4:6–8: "In this regard, FIG. 2B shows a SNR versus frequency graph for an example HFC

network that uses eight channels/subcarriers."). *Third*, the specification describes examples of a "worst-case SNR profile" is the SNR profile related to a cable modem or group of cable modems, indicating their worst-case performance metrics:

> The line **222** in FIG. 2B represents a composite worst-case SNR profile for one or more CM(s) in the HFC network to which the message **202** is destined. For example, line **222** may be a SNR profile for a single CM $\mathbf{112}_X$ to which the message **202** is to be unicast. As another example, the line **222** may be a composite worst-case SNR profile for a plurality of CMs **112** of a particular service group to which the message **202** is to be multicast. As another example, the line **222** may be a composite worst-case SNR profile for all CMs of an HFC network handled by the CMTS **102** to which the message **202** is to be broadcast. The message 202 may

*Id.* at 4:9–20; *see also* FIG. 2C and 5:7–12. The specification further explains how understanding this worst-case expectation for a group of cable modems across the various frequencies (the profile) can be used to optimize choices for that group:

> For example, for any particular service group, the modulation order and FEC code rate to be used on a particular subcarrier may be determined based on the worst case SNR for that subcarrier among the CMs in that particular service group. Thus, it can be seen that grouping CMs based on SNR profiles may enable configuring physical layer communications parameters to such that one or more communication parameters (throughput, reliability, etc.) is optimal, or near-optimal, for all of the CMs in the service group. For example, without such grouping by SNR profile, one CM in a particular service group may have substantially lower SNR on one or more channels/subcarriers. As a result, all CMs in that particular service group may be forced to use physical layer parameters supported by this "lowest common denominator" CM. This may result in a lot of wasted capacity for the remaining CMs.

*Id.* at 5:42–57. Moreover, the concept of a ***composite*** SNR-related metric is understood by a POSITA "as being a composite of metrics in the context of worst-case SNR" (*see* Kramer Decl. ¶¶168–169), and is well-understood in view of the intrinsic evidence where a composite SNR profile is discussed (*see* '682 Patent, 4:40–52, 5:7-12, Fig. 3A).

Considering the '682 Patent's disclosure, it is unclear how Charter will argue a POSITA would not understand this term in view of the specification.

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "service group[s]" (cl. 1) | Plain and ordinary meaning. No construction necessary. | A "service group" is the complete set of downstream and upstream channels within a single CMTS that a single cable modem could potentially receive or transmit on. |

The Court should construe this term according to its plain and ordinary meaning because:

- A "service group" is a plain English term, and the claim and specification confirm that the groups consist of cable modems (CMs), not ***channels***. Charter's construction is simply wrong.
- Furthermore, Charter is attempting to join the upstream and downstream channels without basis in the claim language and contrary to the specification.

The plain language of claim 1 of the '682 Patent is clear—the claim is about grouping cable modems (CMs) into service groups:

> 1. A method comprising:
> determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric;
> assigning, by said CMTS, each cable modem among a plurality of service groups based on a respective corresponding SNR-related metric;

The specification clearly describes service groups including groupings of ***cable modems***, not channels: "FIGS. 4A and 4B illustrate the network of FIG 1, with different groupings of CMs based on one or both of: measured performance metric(s) and location within the HFC network." *Id.* at 2:24–27; *see also, id.* at Abstract ("The CMTS may assigning [sic] the cable modems among a plurality of service groups based on the SNR-related metrics. For any one of the cable modems, the CMTS may configure physical layer communication parameters to be used by the one of the modems based on a SNR-related metric of a service group to which the one of the modems is assigned."); *see also, id.* at 6:39–41 ("While FIGS. 3A and 3B depict SNR profiles and location

as two separate bases on which to assign CMs to service groups, the two may be used in combination."). This alone is fatal to Charter's construction.

However, Entropic notes that Charter's proposed construction is even more flawed in two additional aspects (though this seems to be a feature, not a bug). *First*, Charter does not merely replace cable modems with channels, it requires the group of channels to be both upstream and downstream. Yet the specification discloses the invention may facilitate the CMTS's communication with cable modems using physical layer parameters in ***either*** or both of the upstream and downstream. *See id.* at cl. 1, 5:1–20. "Physical layer parameters may be configured/coordinated using upstream and/or downstream MAP messages, upstream channel descriptors (UCDs)…and/or purpose-specific messages…" *Id.* at 5:21–27. *Second*, Charter's service groups are limited to "a single CMTS and ***a single cable modem***." Not only is this claim redrafting inconsistent with the claims, it also excludes embodiments described in the '682 Patent grouping several cable modems. Charter's proposed construction is improper at least in that it excludes embodiments disclosed in the specification. *Nobel Biocare Servs. AG v. Instradent USA, Inc.*, 903 F.3d 1365, 1381 (Fed. Cir. 2018), *as amended* (Sept. 20, 2018) (Where there is no disclaimer in the prosecution history, "there is a strong presumption against a claim construction that excludes a disclosed embodiment."); *see also SynQor, Inc. v. Artesyn Techs., Inc.*, 709 F.3d 1365, 1378–79 (Fed. Cir. 2013) ("A claim construction that 'excludes the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support.'"). The claim is directed to grouping cable modems, not channels. *See, e.g.*, '682 Patent, cl. 1; *id.* at Abstract.

Charter's construction suffers numerous fatal flaws and should be rejected.

| Claim Term | Entropic's Construction | Charter's Construction |
|---|---|---|
| "[communicating with/corresponding to] said one of said plurality of service groups" (cl. 1) | Plain and ordinary meaning. No construction necessary. | Indefinite. |

The Court should construe this term according to its plain and ordinary meaning because:

- Given the intrinsic evidence, Charter cannot carry the burden of establishing indefiniteness.

Claim 1 itself of the '682 Patent is clear on how service groups, composed of cable modems, and the CMTS communicate: "selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric…" '682 Patent, cl. 1. The "said plurality" is the very same plurality of service groups referenced in the preceding element. The specification has a multitude of references to the communication with the service group by way of, for example, physical layer parameters since the invention could not work without communication. *Id.* at Abstract, 5:7–15, 5:21–27, 5:58–6:6. Further, the terms "communicating," "corresponding," and "plurality" each have plain English meanings that are well-understood, and the combination of the terms do not create any ambiguity.

## V. CONCLUSION

For the reasons set forth above, Entropic respectfully requests that this Court adopt its proposed constructions of the claim terms at issue.

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Respectfully submitted,

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**CERTIFICATE OF SERVICE**

I hereby certify that a copy of the foregoing document was filed electronically in compliance with Local Rule CV-5(a) and served on all counsel of record via the Court's CM/ECF system on this 9th day of May, 2023.

*/s/ Andrea L. Fair*
Andrea L. Fair

# EXHIBIT 1

US008223775B2

(12) **United States Patent**
**Li et al.**

(10) **Patent No.: US 8,223,775 B2**
(45) **Date of Patent: Jul. 17, 2012**

(54) **ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM**

(75) Inventors: **Gordon Y. Li**, San Diego, CA (US); **Yoav Hebron**, San Diego, CA (US)

(73) Assignee: **Entropic Communications, Inc.**

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 2220 days.

(21) Appl. No.: **10/675,566**

(22) Filed: **Sep. 30, 2003**

(65) **Prior Publication Data**

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(51) **Int. Cl.**
*H04L 12/46* (2006.01)

(52) **U.S. Cl.** ..... **370/401**; 709/249

(58) **Field of Classification Search** ..... 709/249
See application file for complete search history.

(56) **References Cited**

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| 2006/0080650 | A1 * | 4/2006 | Winters et al. | 717/168 |

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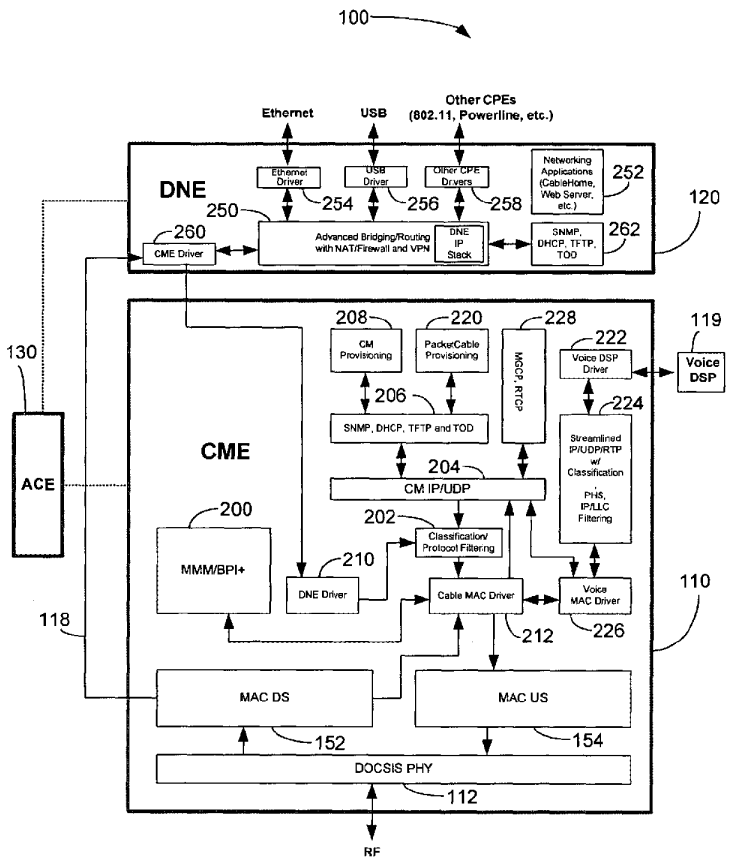
(57) **ABSTRACT**

A cable modem system and architecture. A cable modem engine performs all cable modem functions, and a data networking engine performs all data and home networking functions. The cable modem engine is completely partitioned from the data networking engine. DOCSIS and VoIP functionality is implemented in the cable modem engine. The VoIP functionality may be in accordance with the PacketCable specification. The data networking functionality provided by the data networking engine may be in accordance with the CableHome specification.

**20 Claims, 2 Drawing Sheets**



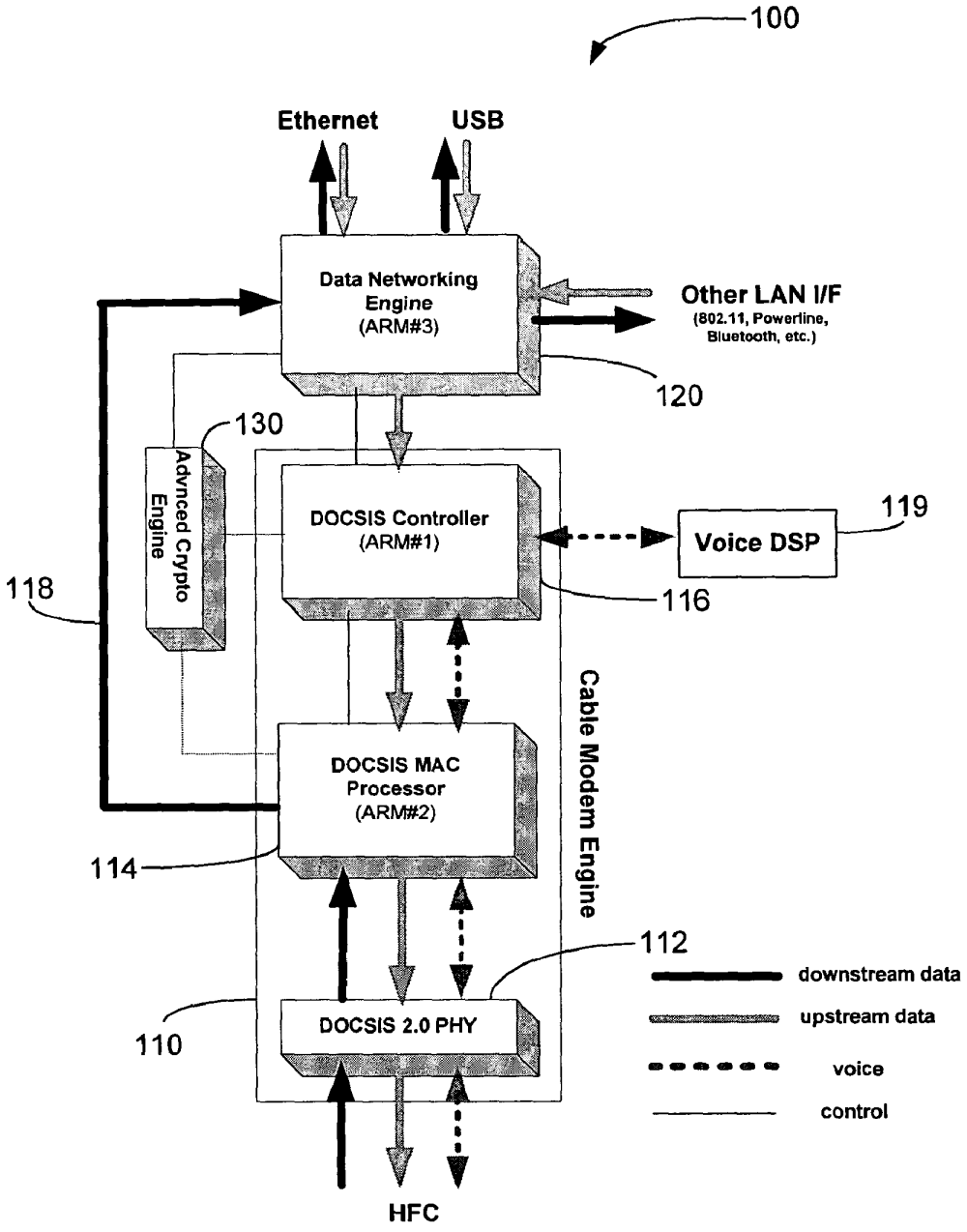

100
Ethernet
USB
Data Networking Engine (ARM#3)
Other LAN I/F
(802.11, Powerline, Bluetooth, etc.)
120
130
Advnced Crypto Engine
DOCSIS Controller (ARM#1)
Voice DSP
119
118
116
Cable Modem Engine
DOCSIS MAC Processor (ARM#2)
114
112
DOCSIS 2.0 PHY
110
HFC
downstream data
upstream data
voice
control

*Figure 1*

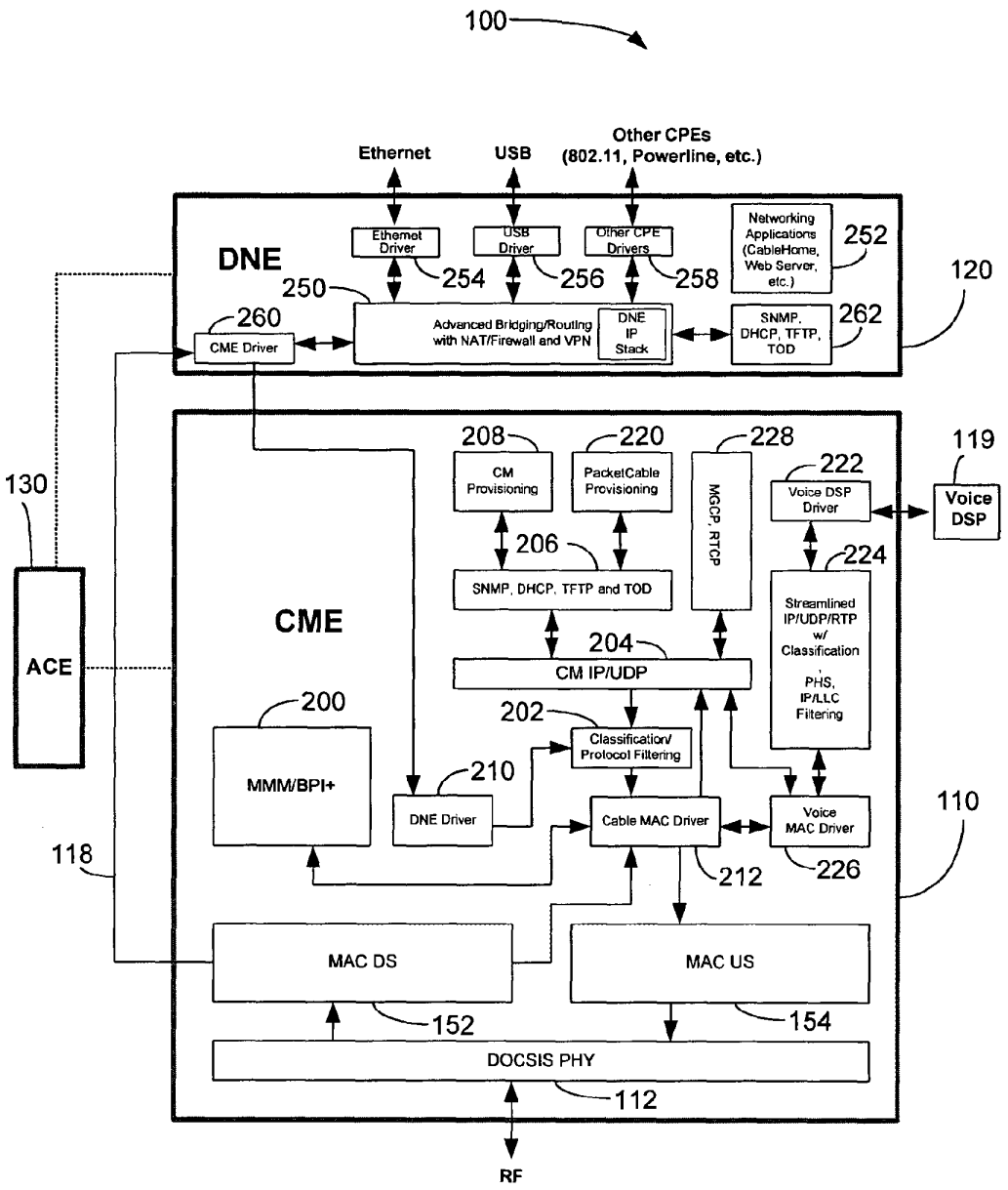

100
Ethernet
USB
Other CPEs
(802.11, Powerline, etc.)
DNE
Ethernet Driver
USB Driver
Other CPE Drivers
Networking Applications (CableHome, Web Server, etc.)
252
254
256
258
250
120
260
CME Driver
Advanced Bridging/Routing with NAT/Firewall and VPN
DNE IP Stack
SNMP, DHCP, TFTP, TOD
262
208
220
228
119
130
CM Provisioning
PacketCable Provisioning
MGCP, RTCP
222
Voice DSP Driver
Voice DSP
206
224
SNMP, DHCP, TFTP and TOD
CME
Streamlined IP/UDP/RTP w/ Classification
PHS, IP/LLC Filtering
204
CM IP/UDP
ACE
200
202
Classification/ Protocol Filtering
MMM/BPI+
210
DNE Driver
Cable MAC Driver
Voice MAC Driver
110
118
212
226
MAC DS
MAC US
152
154
DOCSIS PHY
112
RF

*Figure 2*

# ARCHITECTURE FOR A FLEXIBLE AND HIGH-PERFORMANCE GATEWAY CABLE MODEM

## FIELD OF THE INVENTION

The present invention relates to cable modems and, in particular, relates to a cable modem system having a functionally partitioned and flexible architecture.

## BACKGROUND OF THE INVENTION

The future gateway cable modem (CM) will provide a wide range of data networking and VoIP services, as exemplified by the requirements for initiatives such as CableHome and PacketCable. The major challenge in designing such a gateway cable modem is integration of these services with the basic cable modem functionality in an efficient and cost-effective. Several objectives need to be met:

Functional Partitioning. The gateway cable modem will incorporate a variety of functions beyond the traditional cable modem, including IP routing, network address translation (NAT)/firewall, virtual private network (VPN), web server and VoIP. These functions need to utilize DOCSIS (Data Over Cable Service Interface Specification)services (link-layer transport and QoS) for wide area network (WAN) access. Partitioning these functions along with other cable modem functions among different computational agents is an essential issue in designing a gateway cable modem.

Flexiblity. The architecture of the gateway cable modem should be flexible enough to allow independent software development and field-upgrade of gateway value-added services and basic DOCSIS cable modem services. From a development standpoint, the architecture should facilitate different software-partnering models, including all in-house, software components licensing, and OEM vendor-differentiating design. From a multiple system operator (MSO) perspective, it is highly desirable to be able to independently provision, maintain and upgrade revenue-producing gateway services and basic broadband access services.

Performance. The gateway cable modem should be able to support a large number of simultaneous data application sessions originated from/terminated on multiple CPE (customer provided equipment) devices. VoIP applications must not be adversely impacted by an concurrent data applications, and the data path for voice packets must be optimized to minimize delay and jitter.

Cost. The gateway cable modem chip should have a small incremental hardware cost/functional increase relative to stand-alone cable modem chips.

Software Re-Use. It should be possible to carry over existing cable modem software to the new gateway cable modem without major changes. The existing software running on network processors should be easily portable to run on the gateway platform without major adaptation.

The present invention provides a gateway cable modem architecture that meets all of these objectives.

## SUMMARY OF THE INVENTION

The present invention provides a gateway cable modem system and architecture that meets the above objectives and provides a highly flexible, high performance system capable of handling multiple cable modem voice, data and networking services.

One embodiment of the invention is a cable modem system comprising a data networking engine that performs data networking functions and a cable modem engine that performs all other cable modem functions, wherein the cable modem engine is completely partitioned from the data networking engine.



Another embodiment of the invention is a cable modem architecture. The architecture includes a cable modem engine having a DOCSIS PHY layer with a hardware transmitter and receiver, a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications, and a DOCSIS controller implementing VoIP functionality. The architecture also includes a data networking engine implementing all data networking processing and home networking applications. The data networking engine is completely decoupled from the cable modem engine. In one implementation, the VoIP functionality provided by the cable modem is in accordance with the PacketCable specification and the data networking functionality provided by the data networking engine is in accordance with the CableHome specification.

Another embodiment of the invention is a method for providing a flexible and partitioned cable modem gateway. Data and home networking functionality is provided by a data networking engine, and DOCSIS and VoIP functionality is provided by a cable modem engine. The data networking engine is partitioned from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

Other systems, methods, features and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be protected by the accompanying claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. In the figures, like reference numerals designate corresponding parts throughout the different views.

FIG. **1** is a block diagram of a gateway cable modem architecture according to the present invention.

FIG. **2** is a functional block diagram implementing the cable modem architecture of FIG. **1**.

## DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** illustrates a cable modem system architecture **100** according to the present invention. System **100** comprises three major subsystems: cable modem engine **110**; data networking engine **120**; and advanced crypto engine **130**. The functional sub-components of these three-subsystems are illustrated in greater detail in FIG. **2**.

Cable modem engine **110** implements the entire DOCSIS cable modem functionality and is further divided into three functional blocks: DOCSIS PHY layer **112**; DOCSIS MAC processor **114** and DOCSIS controller **116**. DOCSIS PHY layer **112** comprises a hardware transmitter and receiver. In one implementation, it is for a DOCSIS 2.0-compliant PHY. As seen in FIG. **1**, DOCSIS PHY layer **112** receives downstream data, transmits upstream data and receives and transmits voice data from/to an external source. In one implementation, the external source is a HFC (hybrid fiber coax) cable employing both fiber optic and coaxial cable as an effective means for delivering combined data, video, voice, CATV and other communications.

Processor **114** implements real-time critical MAC functions for both upstream (US) and downstream (DS) communications. These functions include US and DS synchronization, DS MAC address filtering, DS protocol filtering, US and DS PHS, concatenation, fragmentation, MAP processing, US transmission scheduling, as well as DOCSIS link-layer DES encryption and decryption. Processor **114** receives downstream data from, provides upstream data to and exchanges voice data in both directions with DOCSIS PHY **112**. It also receives upstream data from, and exchanges voice data in both directions with, controller **116**. To increase downstream throughput, all processing of DS PDU (protocol data unit) packets is done within processor **114** without involving controller **116**. After being processed, DS PDU packets are forwarded by processor **116** directly to data networking engine **120** along path **118**, bypassing controller **116**. In one implementation, processor **114** is an ARM9TDMI-based RISC processor. In FIG. **2**, processor **114** is represented by MAC DS block **152** and MAC US block **154**.

Controller **116** receives US PDU packets from data networking engine **120**. As previously described, DS PDU packets are forwarded by processor **114** to data networking engine **120** without involvement of controller **116**. In one implementation, controller **116** is an ARM940-based RISC processor. Controller **116** implements the following DOCSIS (blocks **200**-**212**) functions: MAC management message (MMM) processing (ranging, registration, UCD, UCC, DCC, DCI, UP-DIS, DSx and BPI+) (functional block **200** of FIG. **2**), IGMP, MAC address learning, classification, US protocol filtering (functional block **202** of FIG. **2**) and CM IP stack and software downloading. Functional block **204** carries out cable modem IP/UDP functions, functional block **206** carries out SNMP, DHCP, TFTP and TOD functionality and functional block **208** is responsible for cable modem provisioning. Controller **116** also includes a data network engine driver **210** in communication with data network engine **120** and cable MAC driver **212**.

In addition, in order to minimize the latency and jitter of voice packets, controller **116** also implements all PacketCable functionality. In FIG. **2**, PacketCable functionality is represented by functional blocks **220**-**228**. These PacketCable functions include provisioning (block **220**), security and signaling. Functional blocks **222** (voice DSP driver), **224** (streamlined IP/UDP/RTP with classification; PHS, IP/LLC filtering) and **226** (voice MAC driver) interface with external voice DSP **119**. Additionally MGCP and RTCP functions are provided by functional block **228**.

Data networking engine **120** is responsible for all data networking processing including advanced multi-port bridging/routing with NAT/firewall and VPN (block **250**) and home networking applications (CableHome, Web Server, etc.) (block **252**). In one implementation, the entire embedded portal services (PS) functionality of the CableHome specification is contained within data networking engine **120**, with the CableHome functionality being completely decoupled from the PacketCable and DOCSIS functionality provided by cable modem engine **110**. As a result of the virtual de-coupling from cable modem engine **110**, data networking engine **120** can be independently software-upgraded without impacting the functionality of cable modem engine **110** (and vice versa).

As seen in FIG. **1**, data networking engine is capable of additional CPE functionality such as Ethernet, USB and other LAN I/F communications (802.11, Bluetooth, Powerline, etc.), with appropriate CPE drivers **254**, **256**, **258** being provided to support such communications. Additionally, cable modem engine driver **260** communicates with cable modem engine **110** and functional block **262** provides SNMP, DHCP, TFTP and TOD functionality.

Advanced crypto engine **130** provides hardware support for crypto functions. These include common crypto functions required by the baseline DOCSIS link-layer security, PacketCable voice security and data-networking security (e.g. VPN). These functions include DES/3DES, AES and HMAC-MD5/SH-1.

The architecture of gateway cable modem **100** addresses the objectives set forth in the "Background" section above as follows:

Functional Partitioning. Cable modem **100** completely partitions data networking functions (advanced bridging/routing, NAT/firewall, VPN, web server and CableHome applications) from DOCSIS cable modem functionality. This is accomplished by localizing data networking functions in the data networking engine processor and localizing cable modem functions in the cable modem engine processor. Additionally, PacketCable VoIP functionality (embedded MTA) is implemented within cable modem engine **110** to address the facts that embedded MTA is closely coupled with cable modem MAC services and that the latency and jitter of voice packets needs to be minimized.

Flexibility. Since the data networking and cable modem functions are decoupled and implemented in different processors **110** and **120**, independent software upgrading and maintenance of these functions is feasible. From a development standpoint, the architecture can facilitate different software-partnering models, such as complete in-house development, software-components licensing and OEM vendor-differentiating design. In particular, data networking engine **120** provides third parties and OEMs with a dedicated computational platform to develop advanced services outside of the baseline cable modem and VoIP/PacketCable services, minimizing their support dependency on the cable modem provider. Moreover, the software architecture within cable modem engine **110** is designed in a modular way so that the PacketCable E-MTA can be implemented with minimum impact on the cable modem.

Performance. System **100** is able to support a large number of simultaneous data-application sessions originated from/terminated on multiple CPE devices. Its performance is enhanced by the pipe-lining nature of system **100**: the processing-intensive functions of the cable modem and data networking are rationally distributed among three different processors: DOCSIS MAC processor **114** (ARM #2); DOCSIS controller **116** (ARM #1); and data networking engine **120** (ARM #3), according to their orders in the packet flow. To further boost downstream throughput, the downstream PDU packets are directly forwarded from the DOCSIS MAC processor **114** to the data networking engine **120** without going through DOCSIS controller **116**. This is made possible by exploiting the asymmetric nature of the DOCSIS US/DS **152** and **154**. In addition, the data path for voice packets is laid entirely within cable modem engine **110** and is optimized to reduce delay and jitter.

Cost. A chip implementing cable modem system **100** will have only a small incremental hardware cost/functional increase over current stand-alone cable modem chips. The major cost difference relative to current chips is the addition of another ARM940-type processor to the chip.

Software Re-Use. Existing cable modem software may be carried over to system **100** without major or drastic changes. Existing software running on PCD network processors may be easily ported to run on data networking engine **120** without major adaptation.

While various embodiments of the invention have been described, it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible that are within the scope of this invention.

What is claimed is:

**1**. A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment, wherein the at least one processor is a RISC processor;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine including a DOCSIS PHY layer, a DOCSIS controller, and a DOCSIS controller and programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine;

wherein the DOCSIS MAC processor is configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

**2**. A cable modem system as claimed in claim **1**, wherein all DOCSIS functions are localized in the cable modem engine.

**3**. A cable modem system as claimed in claim **2**, wherein VoIP functionality is embedded in the cable modem engine.

**4**. A cable modem system as claimed in claim **1**, and further comprising an advanced crypto engine configured to perform all crypto functions for both the data networking engine and the cable modem engine, the advanced crypto engine being separate from both the data networking engine and the cable modem engine.

**5**. A cable modem system as claimed in claim **1**, wherein the DOCSIS PHY layer includes a hardware transmitter and receiver.

**6**. A cable modem system as claimed in claim **1**, wherein all VoIP functionality is implemented in the DOCSIS controller.

**7**. A cable modem system as claimed in claim **6**, wherein the VoIP functionality is in conformance with the PacketCable specification.

**8**. A cable modem system as claimed in claim **1**, wherein the data networking engine is configured to perform all data networking processing including advanced multi-port bridging routing with NAT/firewall and VPN, and home networking applications.

**9**. A cable modem system as claimed in claim **8**, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

**10**. A cable modem system as claimed in claim **1**, wherein with regard to the cable modem engine:

the DOCSIS PHY layer includes a transmitter and receiver;

the DOCSIS MAC processor is configured to implement real-time MAC functions for both upstream and downstream communications; and

the DOCSIS controller is configured to implement VoIP functionality; and wherein the data networking engine includes a RISC processor configured to implement a majority of data networking processing and home networking applications decoupled from the implementation of the MAC functions and the VoIP functionality of the cable modem engine.

**11**. A cable modem system as claimed in claim **10**, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, wherein the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

**12**. A cable modem system as claimed in claim **11**, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

**13**. A cable modem system as claimed in claim **1**, wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver and the data networking engine is configured to provide the embedded portal services functionality of the CableHome specification, wherein the DOCSIS controller is configured to provide VoIP functionality in accordance with the PacketCable specification, and wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

**14**. A method of cable modem operation comprising:

executing, via at least one processor of a first circuit that implements a data networking engine, first software that causes the data networking engine to perform home networking functions including interfacing with customer provided equipment, wherein the at least one processor is a RISC processor;

executing, via one or more processors of a second circuit that implements a cable modem engine programmed with second software, the second software to cause the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, wherein the second circuit is separate from the first circuit, and wherein the cable modem engine includes a DOCSIS PHY layer, a DOCSIS controller and a DOCSIS controller;

connecting, via a data bus, the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine;

processing, via the DOCSIS MAC processor, downstream PDU packets and forwarding the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

**15**. A method of cable modem operation as claimed in claim **14**, further comprising:

providing a flexible and partitioned cable modem gateway comprising:

providing data and home networking functionality in the data networking engine;

providing DOCSIS and VoIP functionality in the cable modem engine; and

partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

**16**. A method as claimed in claim **14**, further comprising:

providing VoIP functionality in accordance with the PacketCable specification in the DOCSIS controller; and

providing the embedded portal services functionality of the CableHome specification in the data networking engine;

wherein the CahleHome functionality provided hy the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

**17**. A method as claimed in claim **14**, further comprising:

providing the embedded portal services functionality of the CableHome specification in the data networking engine; and

providing VoIP functionality in accordance with the PacketCable specification in the DOCSIS controller;

wherein the data networking engine includes consumer provided equipment drivers including a USB driver and an Ethernet driver; and

wherein the CableHome functionality provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

**18**. A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, the cable modem engine including a DOCSIS controller and a DOCSIS MAC processor, the DOCSIS MAC processor configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

**19**. A cable modem system as claimed in claim **18**, wherein all DOCSIS functions are localized in the cable modem engine.

**20**. The cable modem system as claimed in claim **18** wherein the DOCSIS MAC processor is configured to implement real-time MAC functions for both upstream and downstream communications.

* * * * *

# EXHIBIT 2

US008792008B2

(12) **United States Patent**
**Gallagher et al.**

(10) **Patent No.: US 8,792,008 B2**
(45) **Date of Patent: Jul. 29, 2014**

(54) **METHOD AND APPARATUS FOR SPECTRUM MONITORING**

(75) Inventors: **Timothy Gallagher**, Encinitas, CA (US); **Patrick Tierney**, Solana Beach, CA (US); **Jun Huang**, San Diego, CA (US)

(73) Assignee: **MaxLinear, Inc.**, Carlsbad, CA (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 52 days.

(21) Appl. No.: **13/607,916**

(22) Filed: **Sep. 10, 2012**

(65) **Prior Publication Data**

US 2013/0063608 A1 Mar. 14, 2013

**Related U.S. Application Data**

(60) Provisional application No. 61/532,098, filed on Sep. 8, 2011.

(51) **Int. Cl.**

| | |
|---|---|
| ***H04N 17/00*** | (2006.01) |
| ***H04L 12/66*** | (2006.01) |
| *H04L 12/26* | (2006.01) |
| *H04B 17/00* | (2006.01) |

(52) **U.S. Cl.**

CPC ..... ***H04L 12/66*** (2013.01); *H04L 43/08* (2013.01); ***H04N 17/00*** (2013.01); *H04B 17/0042* (2013.01)

USPC ..... **348/192**

(58) **Field of Classification Search**

USPC ..... 348/192, 725, 572, 731, 729; 455/234.1, 136, 138, 234.2; 375/349, 375/350, 316

See application file for complete search history.

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| 2012/0163518 | A1 * | 6/2012 | Reddy et al. | 375/350 |

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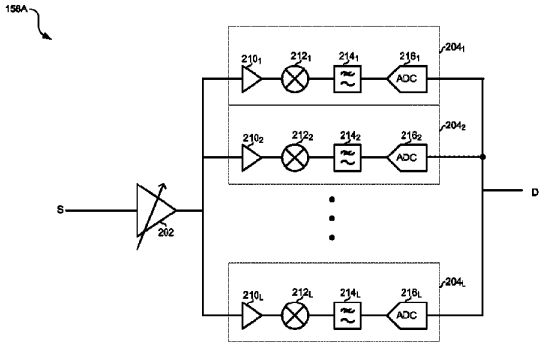
*Primary Examiner* — Paulos M Natnael

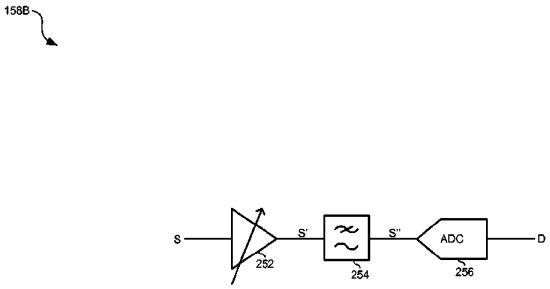
(74) *Attorney, Agent, or Firm* — McAndrews, Held & Malloy, Ltd.

(57) **ABSTRACT**

A system, such as a satellite reception assembly or customer premises gateway, may comprise an analog-to-digital converter operable to digitize a signal spanning an entire television spectrum (e.g., cable television spectrum or satellite television spectrum) comprising a plurality of television channels. The system may comprise a signal monitor operable to analyze a signal to determine a characteristic of the signal. The system may comprise a data processor operable to process a television channel to recover content carried on the television channel. The system may comprise a channelizer operable to select first and second portions of the signal, and concurrently output the first portion to the signal monitor and the second portion to the data processor.

**18 Claims, 7 Drawing Sheets**



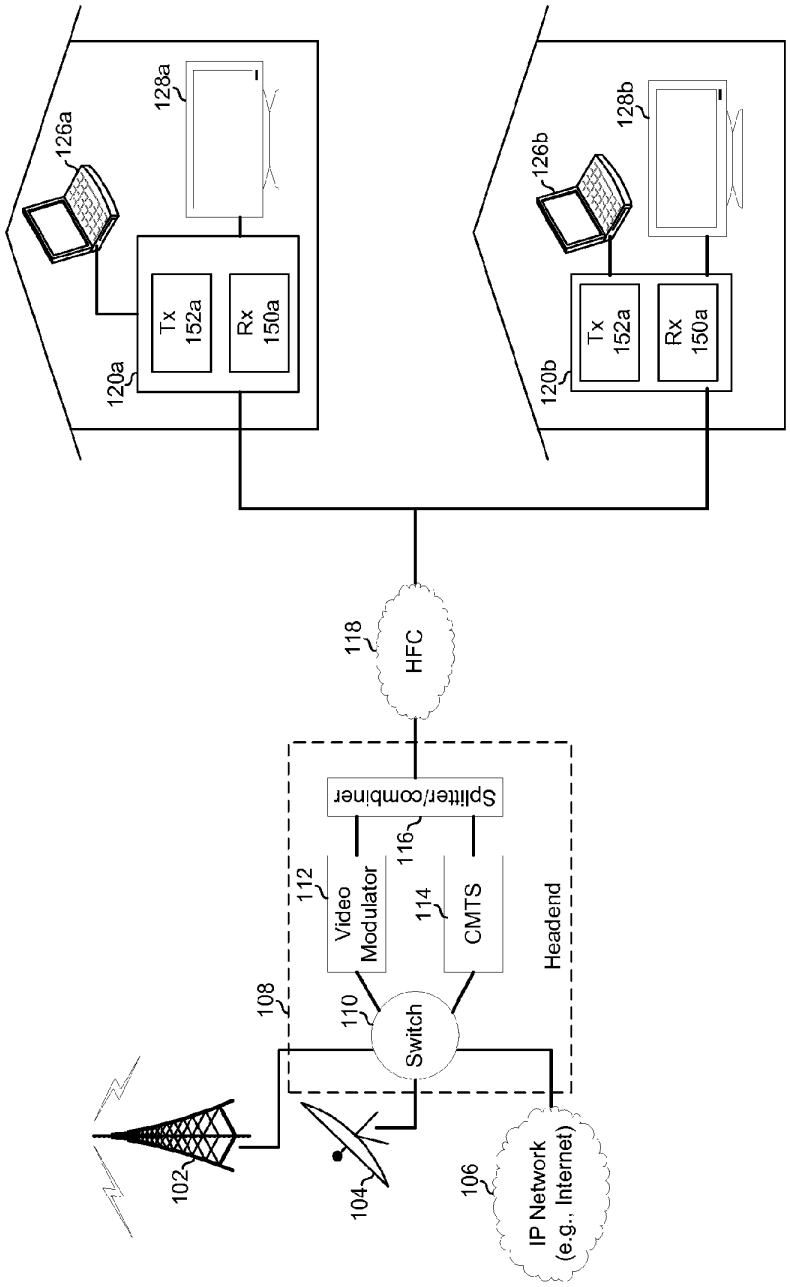

126a
128a
Tx 152a
Rx 150a
120a
126b
128b
Tx 152a
Rx 150a
120b
118
HFC
Splitter/combiner
116
112
Video Modulator
114
CMTS
Headend
108
110
Switch
102
104
106
IP Network (e.g., Internet)

FIG. 1A

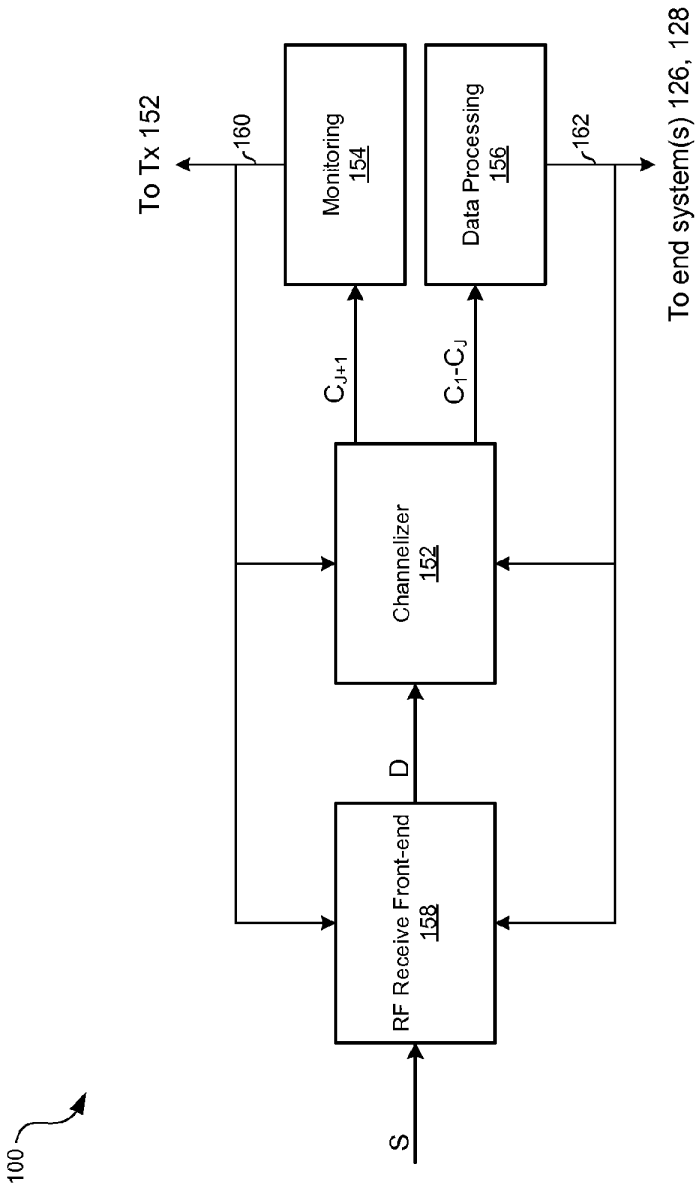

100
S
RF Receive Front-end
158
D
Channelizer
152
$C_{J+1}$
$C_1$-$C_J$
Monitoring
154
Data Processing
156
160
162
To Tx 152
To end system(s) 126, 128

FIG. 1B

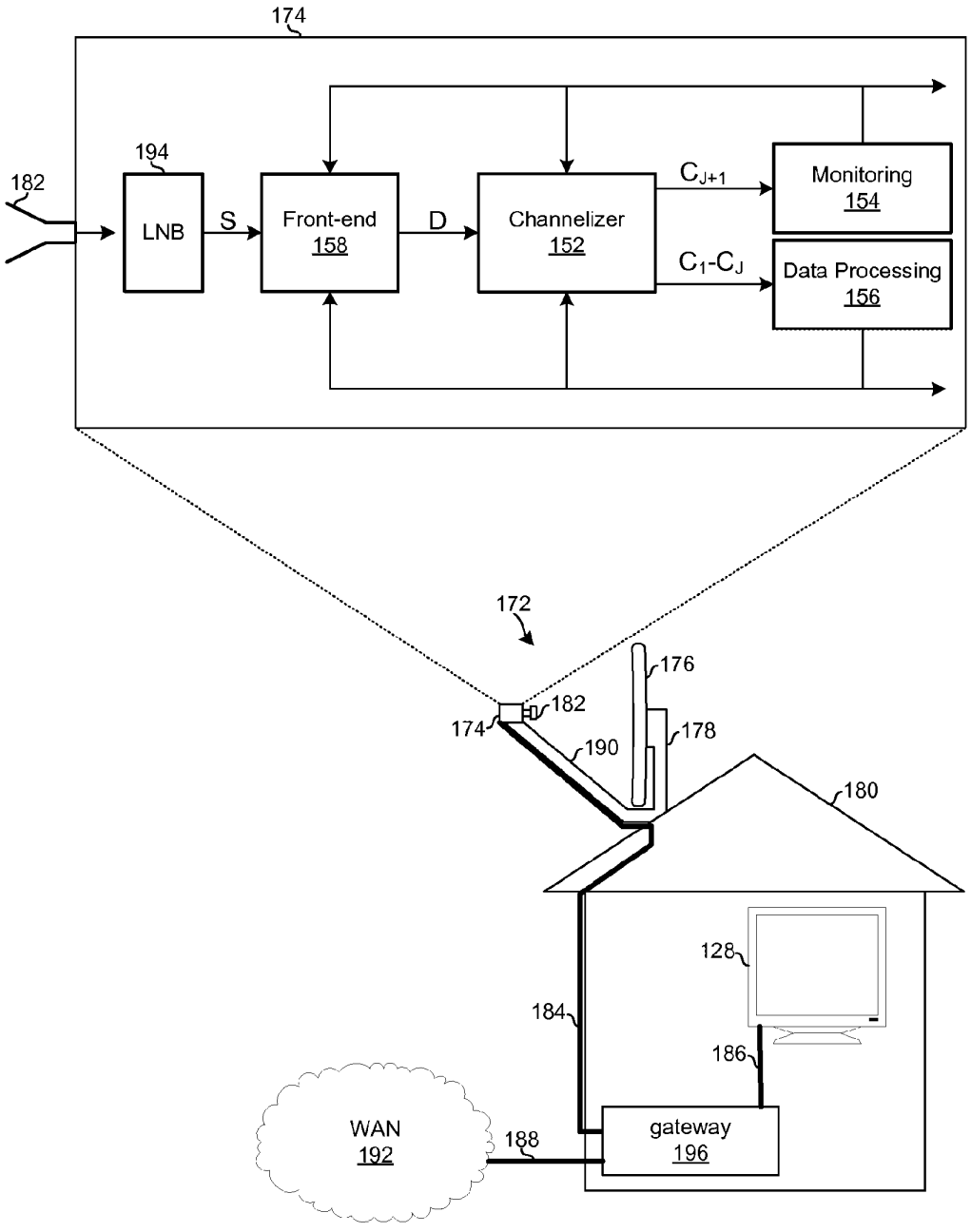

174
194
182
LNB
S
Front-end
158
D
Channelizer
152
$C_{J+1}$
Monitoring
154
$C_1$-$C_J$
Data Processing
156
172
176
182
174
178
190
180
128
184
186
WAN
192
188
gateway
196

FIG. 1C

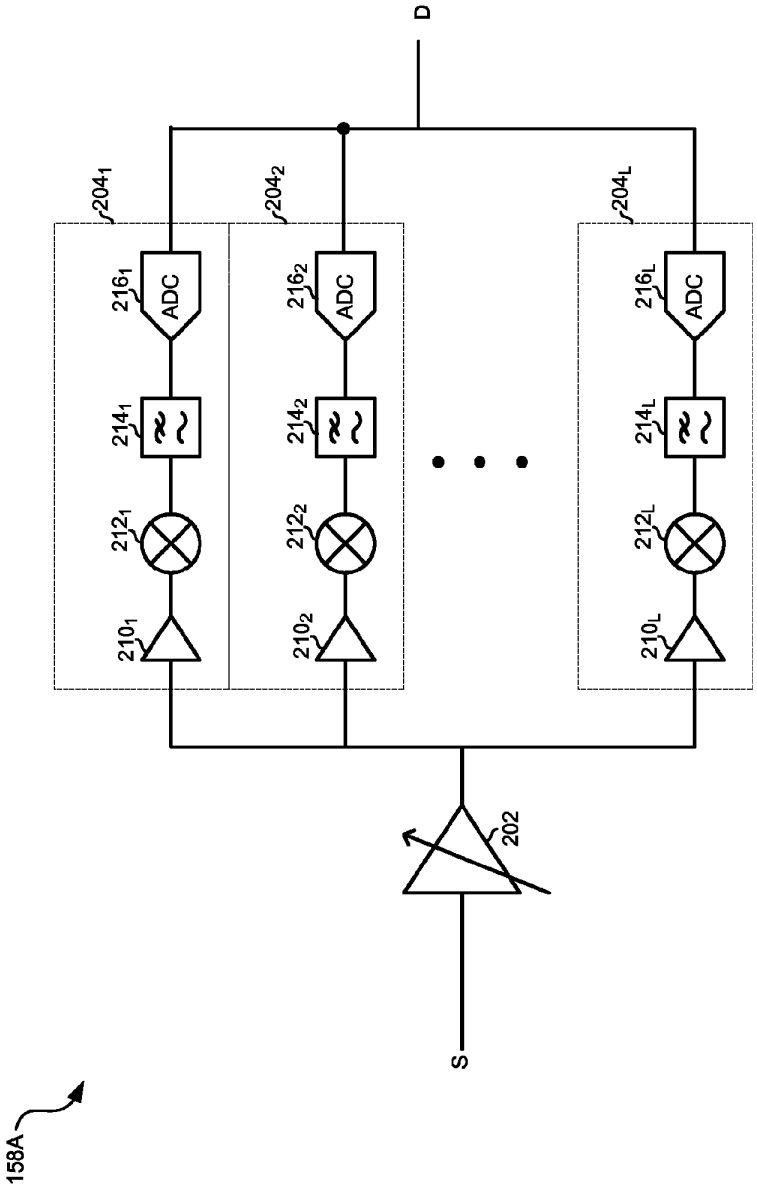

D
$204_1$
$204_2$
$204_L$
$216_1$
ADC
$216_2$
ADC
$216_L$
ADC
$214_1$
$214_2$
$214_L$
$212_1$
$212_2$
$212_L$
$210_1$
$210_2$
$210_L$
202
S
158A

FIG. 2A

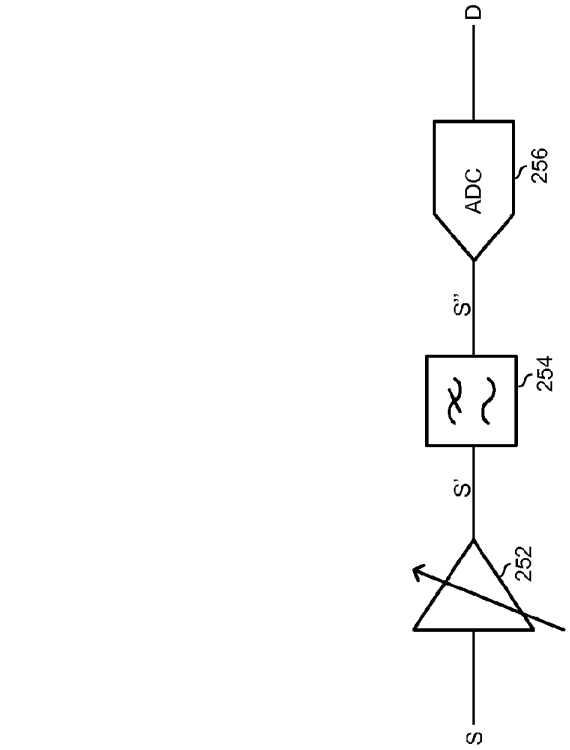



FIG. 2B

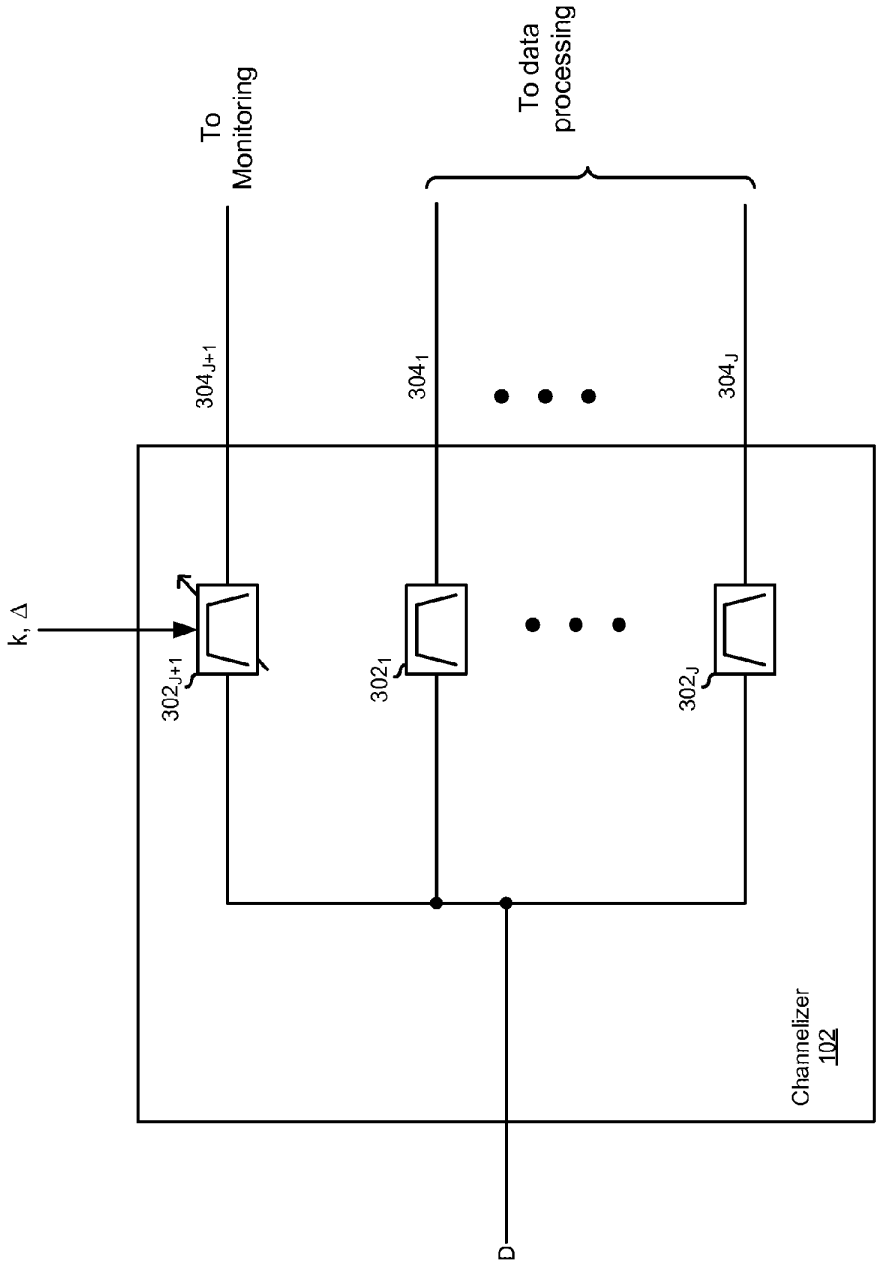

To Monitoring
To data processing
$304_{J+1}$
$304_1$
$304_J$
k, Δ
$302_{J+1}$
$302_1$
$302_J$
Channelizer 102
D

FIG. 3

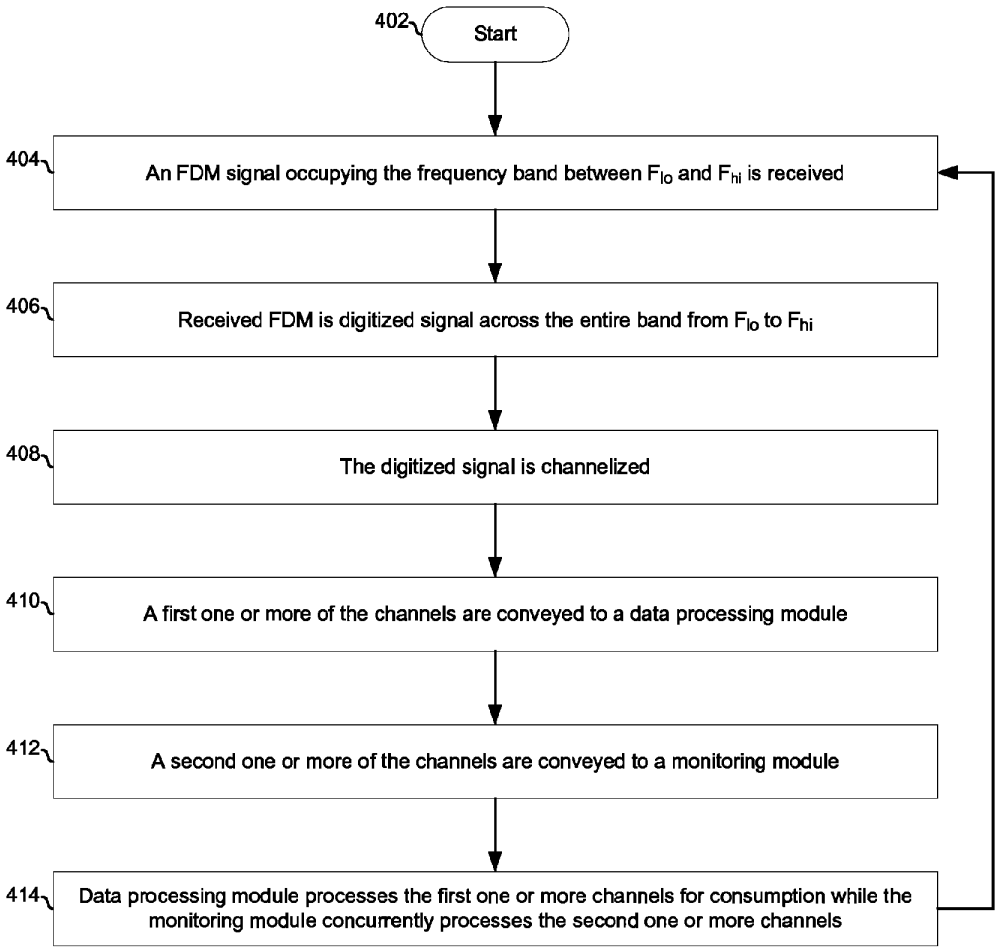

402
Start
404
An FDM signal occupying the frequency band between $F_{lo}$ and $F_{hi}$ is received
406
Received FDM is digitized signal across the entire band from $F_{lo}$ to $F_{hi}$
408
The digitized signal is channelized
410
A first one or more of the channels are conveyed to a data processing module
412
A second one or more of the channels are conveyed to a monitoring module
414
Data processing module processes the first one or more channels for consumption while the monitoring module concurrently processes the second one or more channels

FIG. 4

# METHOD AND APPARATUS FOR SPECTRUM MONITORING

## PRIORITY CLAIM

This patent application makes reference to, claims priority to and claims benefit from U.S. Provisional Patent Application Ser. No. 61/532,098 entitled "Method and Apparatus for Spectrum Monitoring" and filed on Sep. 8, 2011.

The above application is hereby incorporated herein by reference in its entirety.

## INCORPORATION BY REFERENCE

This patent application also makes reference to:

U.S. patent application Ser. No. 13/336,451 entitled "Method and Apparatus for Broadband Data Conversion" and filed on Dec. 23, 2011; and

U.S. patent application Ser. No. 13/485,003 entitled "Multi-layer Time-Interleaved Analog-to-Digital Converter (ADC)" and filed on May 31, 2012; and

U.S. patent application Ser. No. 13/588,769 entitled "Multi-Standard Coverage Map Generation" and filed on Aug. 17, 2012.

Each of the above stated applications is hereby incorporated herein by reference in its entirety.

## FIELD OF THE INVENTION

Certain embodiments of the invention relate to signal processing. More specifically, certain embodiments of the invention relate to a method and system for spectrum monitoring.

## BACKGROUND OF THE INVENTION

Network-based services can become unacceptable if network parameters fall outside of those for which receivers in the network were designed. For example, in a cable television system there are specifications for the number of channels on the plant, the types of channels, the signal levels of those channels and the impairments that can be on the plant that would affect the performance of the receiver. If some or all of these parameters deviate outside acceptable bounds, the user may experience unacceptable performance. Conventional methods and apparatuses for monitoring network parameters are too costly and impractical for use in customer-premises equipment (CPE).

Further limitations and disadvantages of conventional and traditional approaches will become apparent to one of skill in the art, through comparison of such systems with some aspects of the present invention as set forth in the remainder of the present application with reference to the drawings.

## BRIEF SUMMARY OF THE INVENTION

A system and/or method is provided for spectrum monitoring, substantially as shown in and/or described in connection with at least one of the figures, as set forth more completely in the claims.

These and other advantages, aspects and novel features of the present invention, as well as details of an illustrated embodiment thereof, will be more fully understood from the following description and drawings.

## BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

FIG. **1**A depicts an example cable system in accordance with an example embodiment of the invention.



FIG. **1**B depicts an example receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention.

FIG. **1**C depicts an example satellite system in accordance with an example embodiment of the invention.

FIG. **2**A depicts an example RF front-end of a receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention.

FIG. **2**B depicts another example RF front-end of a receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention.

FIG. **3** depicts an example channelizer which may be utilized for performing spectrum monitoring in accordance with an example embodiment of the invention.

FIG. **4** is a flow chart illustrating example steps for spectrum monitoring in accordance with an example embodiment of the invention.

## DETAILED DESCRIPTION OF THE INVENTION

As utilized herein the terms "circuits" and "circuitry" refer to physical electronic components (i.e. hardware) and any software and/or firmware ("code") which may configure the hardware, be executed by the hardware, and or otherwise be associated with the hardware. As utilized herein, "and/or" means any one or more of the items in the list joined by "and/or". For example, "x and/or y" means any element of the three-element set {(x), (y), (x, y)}. Similarly, "x, y, and/or z" means any element of the seven-element set {(x), (y), (z), (x, y), (x, z), (y, z), (x, y, z)}. As utilized herein, the terms "block" and "module" refer to functions than can be implemented in hardware, software, firmware, or any combination of one or more thereof.

FIG. **1**A depicts an example communication system in accordance with an example embodiment of the invention. Shown in FIG. **1** is a terrestrial television antenna **102**, a satellite dish **104**, an Internet Protocol (IP) network **106**, a headend **108**, a wide area network (e.g., hybrid fiber-coaxial (HFC) network) **118**, a gateways **120***a* and **120***b*, end systems **126***a* and **126***b* (e.g., computers), and end systems **128***a* and **128***b*. The headend **108** comprises a switch **110**, a video modulator **112**, a cable modem termination system (CMTS) **114**, and a splitter/combiner **116**.

For downstream traffic, the headend **108** may receive television signals via the antenna **102** and the satellite dish **104**, and may receive data via the IP network **106**. The switch **110** may convey the television signals to the video modulator **112** and the data to the CMTS **114**. The video modulator **112** may modulate the received television signals onto a carrier. The CMTS **114** may modulate the received data onto a carrier. The splitter/combiner **116** may combine the outputs of the video modulator **112** and the CMTS **114** resulting in a frequency division multiplexed (FDM) signal comprising one or more television channels and/or one or more DOCSIS channels. The FDM signal may be onto the wide area network (WAN) **118** for distribution to customer premise equipment (CPE). Each of the gateways **120***a* and **120***b* may comprise a receive module **150** operable to process the received FDM signal as described below.

In an example embodiment, each of the gateways **120***a* and **120***b* may be operable to transmit, via a module **152**, messages to the CMTS **114**. For such upstream data, the gateways **120***a* and **120***b* may modulate messages (e.g., network management/maintenance messages) onto one or more carriers for transmission via the WAN **118**. The splitter/combiner **116** may then convey the message to the CMTS **114**. The CMTS **114** may process the messages and, in an example embodi-

ment, adjust transmission parameters (e.g., modulation parameters, transmit power, frequency offsets, etc.) and/or perform other maintenance/management based on the received messages.

FIG. **1**B depicts an example receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention. Shown in FIG. **1**B is a receiver circuit **100** comprising an RF receive front-end module **158**, a channelizer module **102**, a monitoring module **154**, and a data processing module **156**.

The RF receive front-end **158** may be operable to process a received RF signal S to generate a digital signal D. The signal S may be the result of a plurality of television and/or DOCSIS channels being frequency division multiplexed into a single signal. The signal S may occupy a frequency band from $F_{lo}$ to $F_{hi}$. The RF front-end **158** may, for example, amplify, downconvert, filter, and/or digitize the received signal S to generate the digital signal D. Example embodiments of the RF front-end are depicted in FIGS. **2**A and **2**B.

The channelizer **102** may be operable to select J+1 bands (represented as $C_1$-$C_{J+1}$) of the signal S and output each of the selected bands to the monitoring module **154** and/or the data processing module **156**, where J is an integer greater than 1. An example embodiment of the channelizer **102** is depicted in FIG. **3**. Each band $C_j$ may, for example, correspond to the frequency band of one or more television channels. For example, each band $C_j$ may be an integer multiple of 6 MHz (U.S.) or 8 MHz (EU).

In an example embodiment, the channelizer **102** may be implemented entirely in the digital domain and the channelization may be achieved via one or more digital filtering algorithms and/or other digital signal processing algorithms.

The monitoring module **154** may be operable to analyze the band $C_{J+1}$ that it receives from the channelizer **102** to measure/determine characteristics such as, for example, signal power level vs. frequency, delay vs. frequency, phase shift vs. frequency, type and/or amount of modulation, code rate, interference levels, signal to noise ratio, a transfer function of the channel of over which the signal was received, an impulse response of the channel over which the signal was received, and/or any other characteristic that may help assess characteristics of the channel over which the signal was received, assess characteristics of the transmitter that sent the signal and/or any otherwise be pertinent to performance of the communication system. The monitoring module may also be operable to generate one or more control signals **160** for configuring the channelizer **102** and/or for configuring the RF front-end **158**. Additionally or alternatively, the control signal(s) **160** output by the monitoring module **154** may control the transmission of network management/maintenance messages by the device **150**. Such message may comprise, for example, network status updates indicating whether one or more communication parameters of one or more received television or DOCSIS channels are outside acceptable bounds, and/or conveying measured/determined characteristics back to a source of the received signal (e.g., back to a cable headend), In an example embodiment, the monitoring module **174** may be operable to demodulate signals for measuring one or more characteristics such as signal-to-noise ratio, code rate.

The data processing module **156** may be operable to process the bands $C_1$-$C_J$ conveyed to it by the channelizer **102** to recover data present in one or more television channels present in those bands of the signal S. The data processing module **156** may, for example, perform synchronization, equalization, and decoding. The data processing module **156** may output processed data (e.g., MPEG transport stream packets and/or Internet Protocol packets) to end systems **126**, perhaps via an interface such as an HDMI interface and/or an Ethernet interface (not shown). The data processing module **156** may also be operable to generate one or more control signals **162** for configuring the channelizer **102** and/or the receive front-end **158**.

The parallel arrangement of the monitoring module **154** and data processing module **156** may enable determination of signal and/or channel characteristics without having to interrupt service to user equipment **126** and **128**.

In an example embodiment, the signal S may be a cable television signal with $F_{lo}$≈55 MHz, $F_{hi}$≈1002 MHz. In an example embodiment, the signal S may be a MoCA signal with with $F_{lo}$≈1150 MHz and $F_{hi}$≈2100 MHz. These numbers are purely for illustration and not intended to be limiting.

In an example embodiment, the signal S may he a satellite television signal such as may be at the input of a LNB, at the output of a LNB, or at the input of a indoor unit (e.g., set top box). In such an embodiment, the front-end **158**, channelizer **152**, data processing module **154**, and/or monitoring module **154** may reside in the indoor unit (e.g., set-top box), outdoor unit (e.g., satellite dish or accompanying components), and/or may be distributed among the indoor unit and outdoor unit of a satellite installation residing at a customer premises. An example of such an embodiment is shown in FIG. 1C.

In operation of such an example embodiment, the signal S may be amplified, possibly downconverted, and digitized by the RF front-end **158** to generate the signal D. The channelizer **102** may then select J bands of the signal D for output to the data processing module **156**. Each of the selected bands $C_1$-$C_J$ may, for example, comprise one or more of the cable television channels and/or one or more of the DOCSIS channels that make up the signal S. The data processing module **156** may provide one or more control signals to determine which portion of the signal D is selected for each of the bands $C_1$-$C_J$. The selection may be based, for example, on which television channels are being consumed by end systems **128** and/or whether DOCSIS data is being consumed by end systems **126**. The channelizer **102** may also select one band, represented as band $C_{J+1}$, to be output to the monitoring module **154**. Band $C_{J+1}$ may comprise any portion or portions (including the entire bandwidth from $F_{lo}$ to $F_{hi}$) of the signal D. Which portion of the signal S is selected as band $C_{J+1}$ may, for example, be configured by the monitoring module **154**. The data processing module **156** may process one or more of bands $C_1$-$C_J$ to recover data on one or more channels (e.g., television and/or DOCSIS channels) present in those bands while the monitoring module **154** may concurrently process band $C_{J+1}$ to measure/determine characteristics of all or a portion of the signal S between $f_{lo}$ and $f_{hi}$.

FIG. **1**C depicts an example satellite system in accordance with an example embodiment of the invention. Shown in FIG. **1**C is a satellite dish assembly **172**, and a gateway **196**. The subassembly **174** comprises a feed horn **182**, an LNB **194**, the front-end **158**, the channelizer **152**, the monitoring module **154**, and the data processing module **156**. The various modules of the subassembly **174** may reside in one or more housings, on one or more printed circuit boards, and/or one or more integrated circuits (e.g., one or more silicon dice). In another example embodiment, the monitoring module **154** and/or the data processing module **156** may reside in the gateway **196**.

In the example embodiment depicted, the satellite dish assembly **172** comprises a parabolic reflector **176** and a subassembly **174** mounted (e.g., bolted or welded) to a support structure **178** which, in turn, comprises a boom **190** and attaches (e.g., via bolts) to the premises **180** (e.g., to the roof).

In another example embodiment, all or a portion of the modules **152**, **154**, and/or **156** may be mounted to the premises **180** separate from the satellite dish (e.g., connected via wired and/or wireless connections), but may still be part of the "outdoor unit."

The gateway **196** may receive data from the satellite dish assembly **172** (via cable(s) **184**). The gateway and may transmit data onto and receive data from the WAN **192** (via broadband connection **188**). The gateway **196** may transmit data to and receive data from user equipment **128** and **126** (via one or more connections **186**).

FIG. **2**A depicts an example RF front-end of a receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention. The RF front-end **158**A shown in FIG. **2**A comprises a variable gain amplifier **202**, and receive chains $\mathbf{204}_1$-$\mathbf{204}_L$, where L is an integer greater than or equal to 1. Each receive chains $\mathbf{204}_1$ may comprise an amplifier module $\mathbf{210}_1$, a mixer module $\mathbf{212}_1$, a filter module $\mathbf{214}_1$, and an analog-to-digital converter (ADC) module $\mathbf{216}_1$, where 1 is an integer between 1 and L.

Each amplifier $\mathbf{210}_1$ may be operable to amplify a band **1** of the signal S. Each mixer $\mathbf{212}_1$ may be operable to mix a band **1** of the signal S with a local oscillator signal (not shown) to downconvert the band **1** to a lower frequency. Each filter module $\mathbf{214}_1$ may be operable to bandpass filter the band **1** to remove/attenuate frequencies outside band **1**. Each ADC **216** may be operable to convert the band **1** of the analog signal S to a corresponding digital representation. Operation of the RF front-end **158** and/or processing of signals generated by the front-end **158**, may, for example, be as described in U.S. patent application Ser. No. 13/336,451 entitled "Method and Apparatus for Broadband Data Conversion" which is incorporated by reference herein, as set forth above.

In an example embodiment, the front-end **158**A may reside in a cable gateway such as the cable gateway **120** described above. In an example embodiment, the front-end **158**A may reside in satellite gateway/set-top box and/or in an outdoor unit of a satellite reception assembly (e.g., collocated on-chip or on-PCB with a satellite low-noise block downconverter (LNB)).

FIG. **2**B depicts another example RF front-end of a receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention. The RF front-end **158**B shown in FIG. **2**B comprises a variable gain amplifier **252**, a filter **254**, and an ADC **256**. Functions performed by the RF front-end **158**B may be referred to as "full-spectrum capture" (or "FSC").

In the front-end **158**B, the entire bandwidth, from $F_{lo}$ to $F_{hi}$, of signal S may be amplified by the amplifier **252** to generate S'. The amplified signal S' may be then filtered by the filter **254** to remove undesired signals outside of $F_{lo}$ to $F_{hi}$ and generate signal S". The signal S", from $F_{lo}$ to $F_{hi}$, may then be digitized by the ADC **256** to generate signal D. In an example embodiment, the ADC may be as described in U.S. patent application Ser. No. 13/485,003 entitled "Multi-layer Time-Interleaved Analog-to-Digital Converter (ADC)," which is incorporated by reference herein, as set forth above.

In an example embodiment, the ADC **256** may be capable of digitizing a signal S wherein $F_{lo}$ to $F_{hi}$ is 1 GHz or higher. Accordingly, for cable television/DOCSIS, the ADC **256** may be operable to digitize the entire cable downstream (e.g., from ~55 MHz to ~1002 MHz). Similarly, for satellite television, the ADC **256** may be operable to digitize the received signal at the input of the LNB, and/or the downconverted signal (e.g., from ~1 GHz to ~2 GHz) at the output by an LNB.

FIG. **3** depicts an example channelizer which may be utilized for performing spectrum monitoring in accordance with an example embodiment of the invention. Band selection filters $\mathbf{302}_1$-$\mathbf{302}_J$ of the channelizer **102** may each process the signal D to recover a corresponding one of the J selected bands of the signal D, and output the band on a corresponding one of the ports $\mathbf{304}_1$ to $\mathbf{304}_J$. A band selection filter $\mathbf{302}_{J+1}$ of the channelizer **102** may process the signal D to recover band from the signal D, and output band $C_{J+1}$ on the port $\mathbf{304}_{J+1}$. Which band or bands are selected by the filter $\mathbf{302}_{J+1}$ may be configured based on one or more control signals input to the channelizer **102**. For example, the value of a parameter k may determine the center frequency of the portion of signal D that is to be selected as by the filter $\mathbf{302}_{J+1}$, and the value of Δ may determine the bandwidth of the portion of this signal D that is selected as band $C_{J+1}$ for output on the port $\mathbf{304}_{J+1}$. In this manner, all of the signal D between $F_{lo}$ and $F_{hi}$ or any portion or portions of the signal D, may be selected for output on the port $\mathbf{304}_{J+1}$.

FIG. **4** is a flow chart illustrating example steps for spectrum monitoring in accordance with an example embodiment of the invention. After start step **402**, in step **404**, the receiver circuit **100** may receive a frequency division multiplexed (FDM) signal comprising one or more channels (e.g., satellite television channels, cable television channels, and/or DOCSIS channels) occupying a frequency band between $F_{lo}$ and $F_{hi}$. In step **406**, the received FDM signal is digitized across the full band from $F_{lo}$ to $F_{hi}$. In step **408**, the digitized signal is channelized into one or more bands. In step **410**, a first one or more of the bands are conveyed to a data processing module. In step **412** a second one or more of the bands are output to a monitoring module. In step **414**, the data processing module processes one or more of the first one or more bands to recover data on those bands while the monitoring module concurrently processes the second one or more bands to determine characteristics of all or a portion of the frequency band from $F_{lo}$ to $F_{hi}$.

Other embodiments of the invention may provide a non-transitory computer readable medium and/or storage medium, and/or a non-transitory machine readable medium and/or storage medium, having stored thereon, a machine code and/or a computer program having at least one code section executable by a machine and/or a computer, thereby causing the machine and/or computer to perform the steps as described herein for spectrum monitoring.

Accordingly, the present invention may be realized in hardware, software, or a combination of hardware and software. The present invention may be realized in a centralized fashion in at least one computing system, or in a distributed fashion where different elements are spread across several interconnected computing systems. Any kind of computing system or other apparatus adapted for carrying out the methods described herein is suited. A typical combination of hardware and software may be a general-purpose computing system with a program or other code that, when being loaded and executed, controls the computing system such that it carries out the methods described herein. Another typical implementation may comprise an application specific integrated circuit or chip.

The present invention may also be embedded in a computer program product, which comprises all the features enabling the implementation of the methods described herein, and which when loaded in a computer system is able to carry out these methods. Computer program in the present context means any expression, in any language, code or notation, of a set of instructions intended to cause a system having an information processing capability to perform a particular function either directly or after either or both of the following: a)

conversion to another language, code or notation; b) reproduction in a different material form.

While the present invention has been described with reference to certain embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the scope of the present invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the present invention without departing from its scope. Therefore, it is intended that the present invention not be limited to the particular embodiment disclosed, but that the present invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

**1**. A system comprising:
- an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;
- a signal monitor operable to:
  - analyze said digitized signal to determine a characteristic of said digitized signal; and
  - report said determined characteristic to a source of said received signal;
- a data processor operable to process a television channel to recover content carried on the television channel; and
- a channelizer operable to:
  - select a first portion of said digitized signal;
  - select a second portion of said digitized signal; and
  - concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

**2**. The system of claim **1**, wherein said first portion of said digitized signal spans said entire television spectrum.

**3**. A method comprising:
- performing by one or more circuits:
  - receiving a signal having a bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carries a plurality of channels;
  - digitizing said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal;
  - selecting a first portion of said digitized signal;
  - selecting a second portion of said digitized signal; and
  - concurrently outputting said selected first portion and said selected second portion, wherein:
    - said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal; and
    - said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels.

**4**. The method of claim **3**, wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$.

**5**. The method of claim **3**, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.

**6**. The method of claim **3**, wherein:
- said received signal is a cable television signal; and
- said plurality of channels comprises a plurality of television channels.

**7**. The method of claim **3**, wherein:
- said received signal is a satellite television signal output by a low noise block downconverter; and
- said plurality of channels comprises a plurality of television channels.

**8**. The method of claim **7**, wherein said one or more circuits reside in a customer premises satellite reception assembly.

**9**. The method of claim **3**, wherein said one or more circuits reside in a customer premises gateway.

**10**. The method of claim **3**, wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits.

**11**. A system comprising:
- one or more circuits that are operable to:
  - receive a signal having a bandwidth that spans from a first frequency, $F_{lo}$, to a second frequency, $F_{hi}$, wherein said signal carries a plurality of channels;
  - digitize said received signal from $F_{lo}$ to $F_{hi}$ to generate a digitized signal;
  - select a first portion of said digitized signal;
  - select a second portion of said digitized signal; and
  - concurrently output said selected first portion and said selected second portion, wherein:
    - said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal; and
    - said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels.

**12**. The system of claim **11**, wherein said first portion comprises all of said received signal from $F_{lo}$ to $F_{hi}$.

**13**. The system of claim **11**, wherein said one or more characteristics is one of: signal power vs. frequency, phase vs. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.

**14**. The system of claim **11**, wherein:
- said received signal is a cable television signal; and
- said plurality of channels comprises a plurality of television channels.

**15**. The system of claim **11**, wherein:
- said received signal is a satellite television signal output by a low noise block downconverter; and
- said plurality of channels comprises a plurality of television channels.

**16**. The system of claim **15**, wherein said one or more circuits reside in a customer premises satellite reception assembly.

**17**. The system of claim **11**, wherein said one or more circuits reside in a customer premises gateway.

**18**. The system of claim **11**, wherein a bandwidth and/or center frequency of said selected first portion is configurable during operation of said one or more circuits.

* * * * *

# EXHIBIT 3

US009825826B2

(12) **United States Patent**
**Gallagher et al.**

(10) **Patent No.: US 9,825,826 B2**
(45) **Date of Patent: *Nov. 21, 2017**

(54) **METHOD AND APPARATUS FOR SPECTRUM MONITORING**

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(73) Assignee: **Maxlinear, Inc.**, Carlsbad, CA (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/948,947**

(22) Filed: **Nov. 23, 2015**

(65) **Prior Publication Data**

US 2016/0087865 A1 Mar. 24, 2016

**Related U.S. Application Data**

(63) Continuation of application No. 14/341,880, filed on Jul. 28, 2014, now Pat. No. 9,203,653, which is a continuation of application No. 13/607,916, filed on Sep. 10, 2012, now Pat. No. 8,792,008.

(60) Provisional application No. 61/532,098, filed on Sep. 8, 2011.

(51) **Int. Cl.**

| | |
|---|---|
| ***H04N 17/00*** | (2006.01) |
| ***H04L 12/26*** | (2006.01) |
| ***H04L 12/66*** | (2006.01) |
| ***H04B 17/309*** | (2015.01) |

(52) **U.S. Cl.**

CPC ..... ***H04L 43/08*** (2013.01); ***H04B 17/309*** (2015.01); ***H04L 12/66*** (2013.01); ***H04N 17/00*** (2013.01)

(58) **Field of Classification Search**

CPC ..... H04N 17/00
USPC ..... 348/192, 193, 180
See application file for complete search history.

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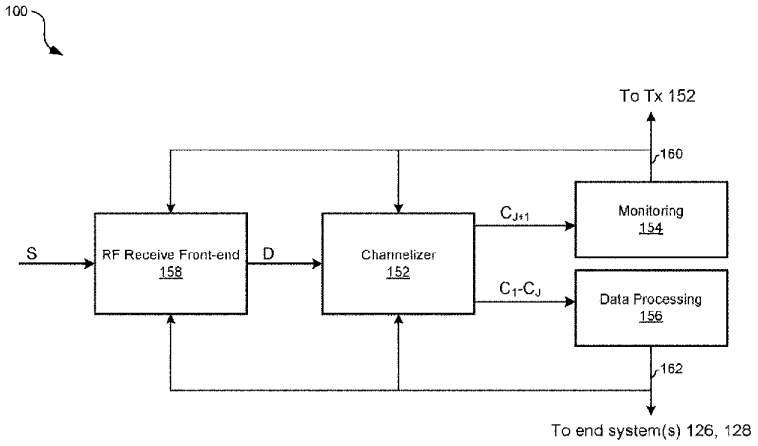
*Primary Examiner* — Paulos M Natnael
(74) *Attorney, Agent, or Firm* — McAndrews, Held & Malloy, Ltd.

(57) **ABSTRACT**

A receiver is configured to be coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network. The receiver comprises front-end circuitry operable to receive a signal that carries a plurality of television and/or data channels, and digitize the received signal to generate a digitized signal. The receiver comprises channelizer circuitry operable to select a first portion of the digitized signal, and select a second portion of the digitized signal. The receiver comprises processing circuitry operable to process the selected second portion of the digitized signal to recover information carried in the plurality of channels. The receiver comprises monitoring circuitry operable to analyze the selected first portion of the digitized signal to measure a characteristic of the received signal; and control the transmission of network management messages back to the headend based on the measured characteristic of the received signal.

**18 Claims, 7 Drawing Sheets**



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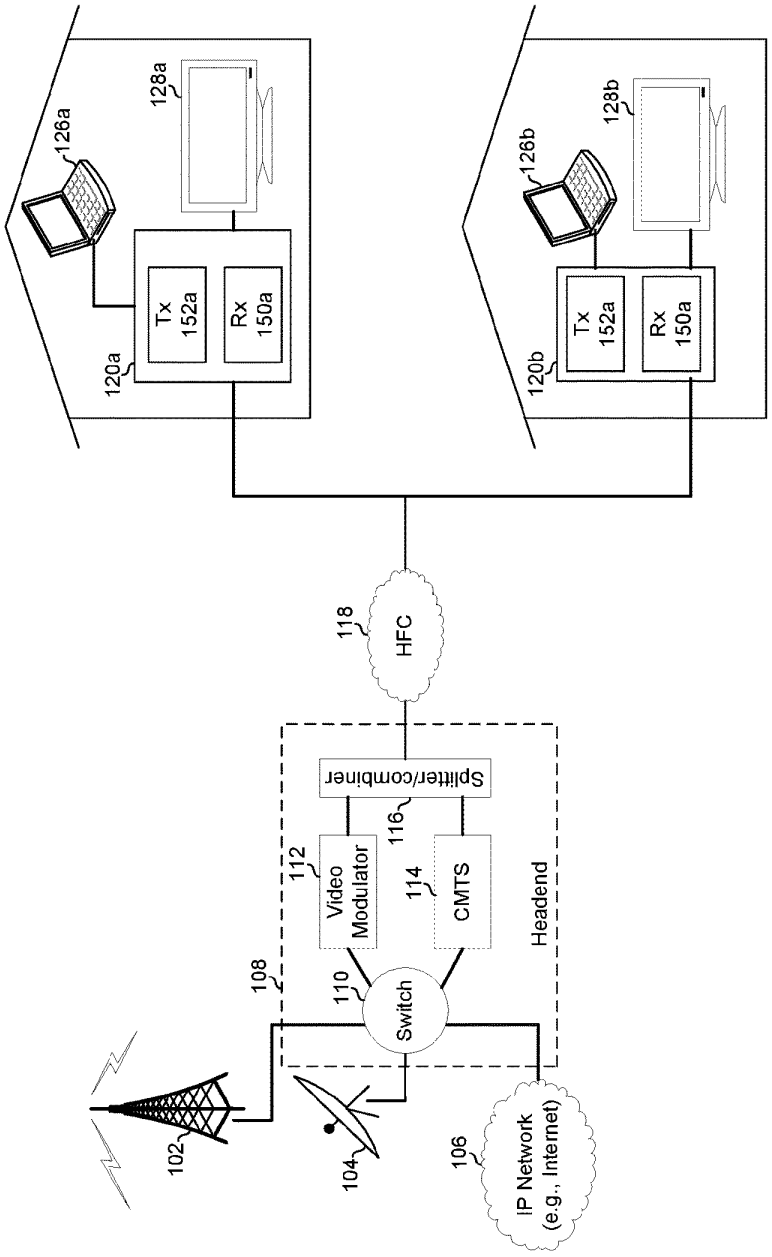
126a
128a
Tx 152a
Rx 150a
120a
126b
128b
Tx 152a
Rx 150a
120b
118
HFC
Splitter/combiner
116
112
Video Modulator
114
CMTS
Headend
108
110
Switch
102
104
106
IP Network (e.g., Internet)

FIG. 1A

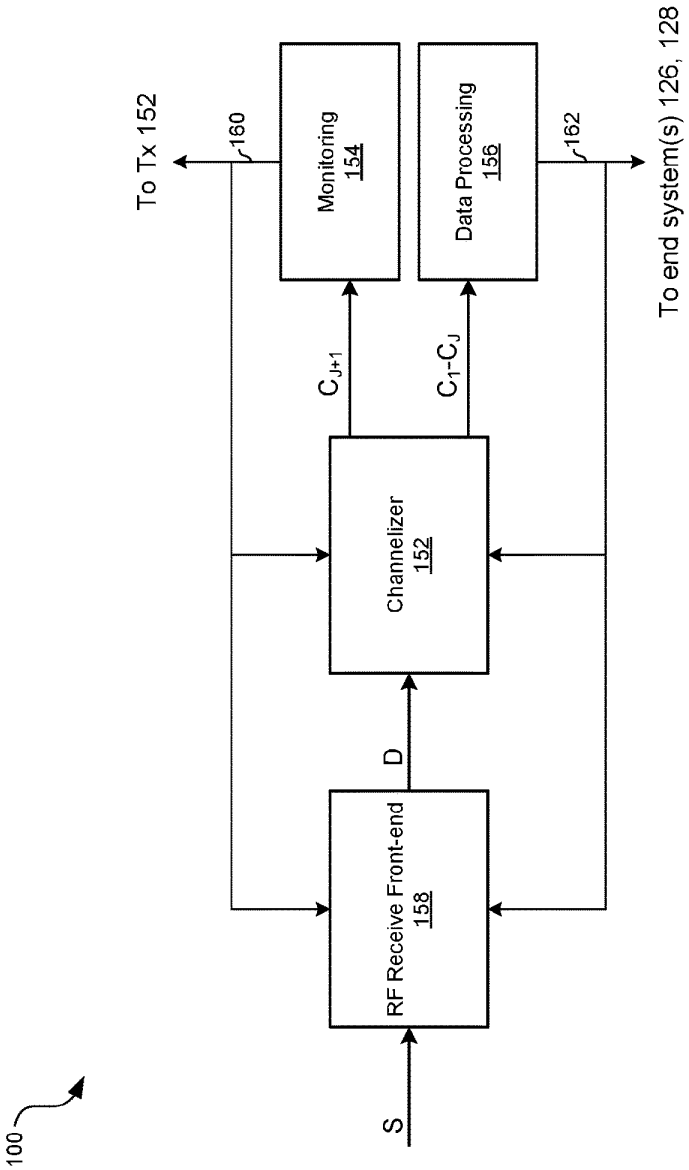
100
S
RF Receive Front-end
158
D
Channelizer
152
$C_{J+1}$
$C_1$-$C_J$
Monitoring
154
Data Processing
156
160
162
To Tx 152
To end system(s) 126, 128

FIG. 1B

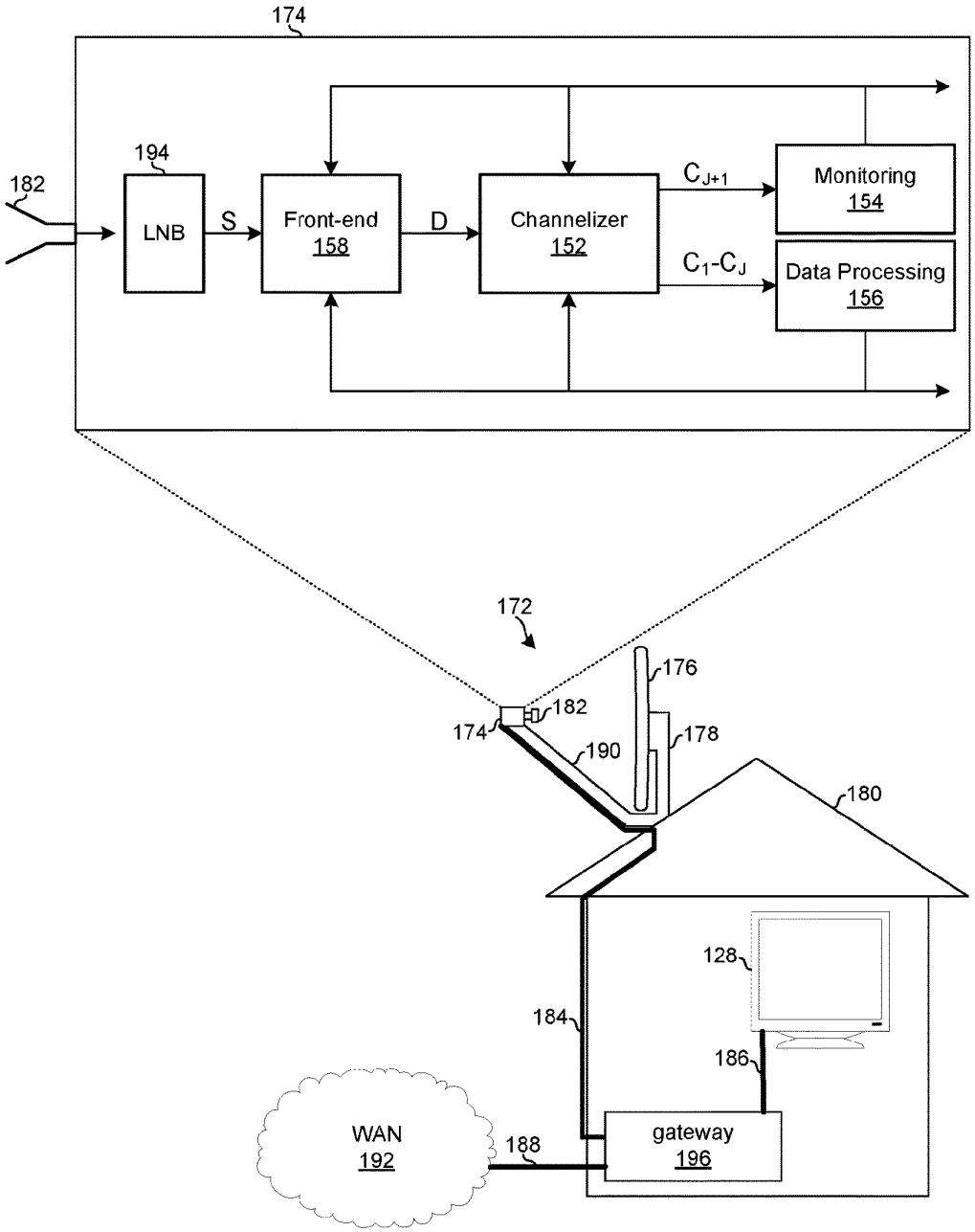
174
194
182
LNB
S
Front-end
158
D
Channelizer
152
$C_{J+1}$
$C_1$-$C_J$
Monitoring
154
Data Processing
156
172
176
182
174
178
190
180
128
184
186
WAN
192
188
gateway
196

FIG. 1C

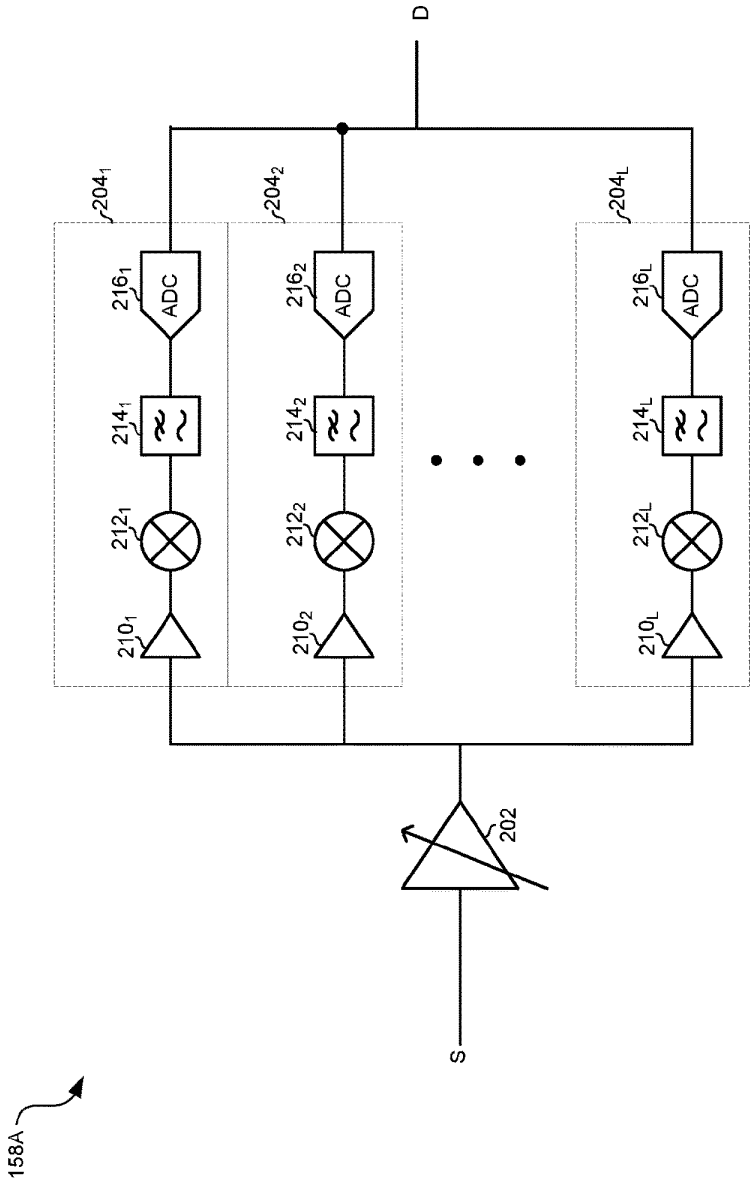
D
$204_1$
$204_2$
$204_L$
$216_1$
$216_2$
$216_L$
ADC
$214_1$
$214_2$
$214_L$
$212_1$
$212_2$
$212_L$
$210_1$
$210_2$
$210_L$
202
S
158A

FIG. 2A

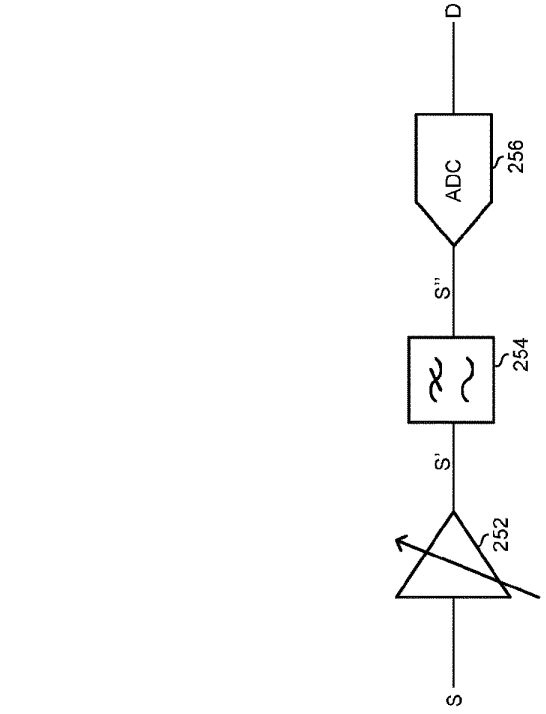


FIG. 2B

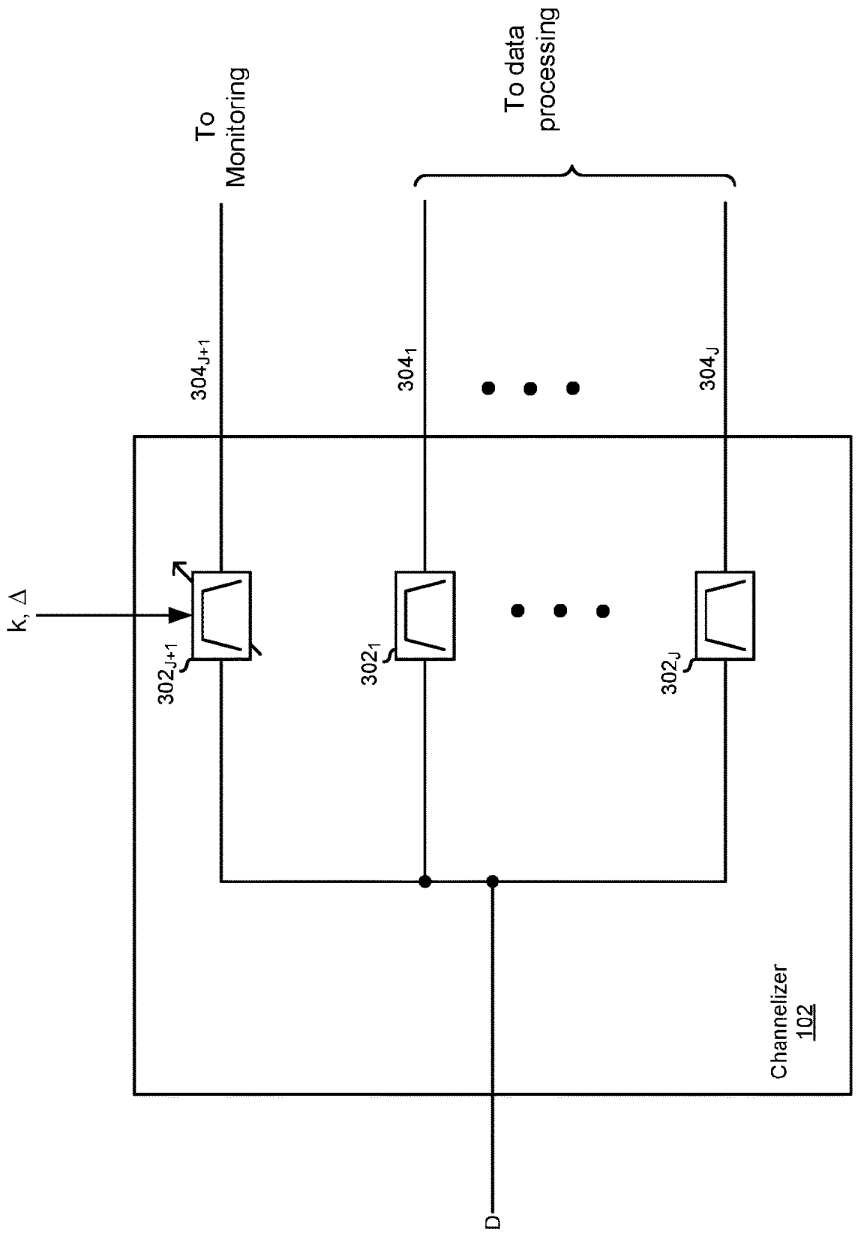
To Monitoring
To data processing
$304_{J+1}$
$304_1$
$304_J$
k, Δ
$302_{J+1}$
$302_1$
$302_J$
Channelizer 102
D

FIG. 3

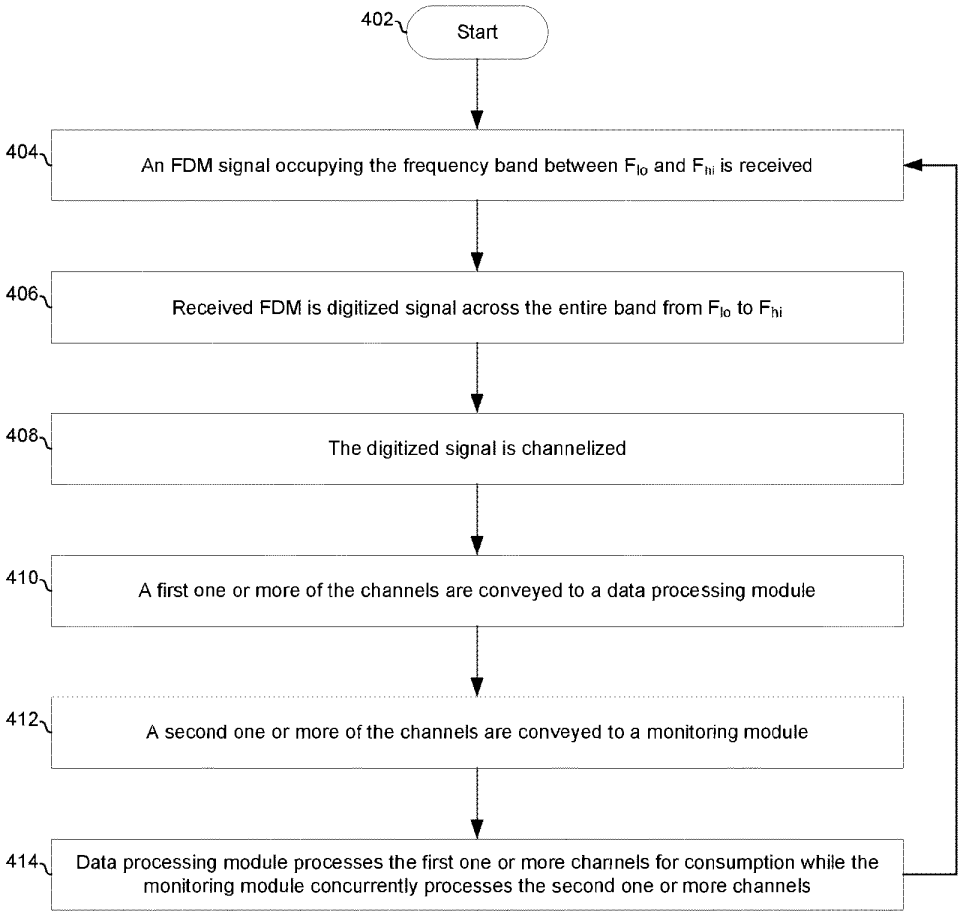
402
Start
404
An FDM signal occupying the frequency band between $F_{lo}$ and $F_{hi}$ is received
406
Received FDM is digitized signal across the entire band from $F_{lo}$ to $F_{hi}$
408
The digitized signal is channelized
410
A first one or more of the channels are conveyed to a data processing module
412
A second one or more of the channels are conveyed to a monitoring module
414
Data processing module processes the first one or more channels for consumption while the monitoring module concurrently processes the second one or more channels

FIG. 4

# METHOD AND APPARATUS FOR SPECTRUM MONITORING

## PRIORITY CLAIM

This patent application is a continuation of U.S. patent application Ser. No. 14/341,880 filed on Jul. 28, 2014 now patented as U.S. Pat. No. 9,203,653, which is a continuation of U.S. patent application Ser. No. 13/607,916 filed on Sep. 10, 2012 now patented as U.S. Pat. No. 8,792,008, which also makes reference to, claims priority to and claims benefit from U.S. Provisional Patent Application Ser. No. 61/532,098 filed on Sep. 8, 2011. Each of the above referenced documents is hereby incorporated herein by reference in its entirety.

## INCORPORATION BY REFERENCE

This patent application also makes reference to:

U.S. patent application Ser. No. 13/336,451 titled "Method and Apparatus for Broadband Data Conversion," filed on Dec. 23, 2011, and published as U.S. Patent Application Publication No. 2012/0163518;

U.S. patent application Ser. No. 13/485,003 titled "Multi-layer Time-Interleaved Analog-to-Digital Converter (ADC)," filed on May 31, 2012 and now patented as U.S. Pat. No. 8,611,483; and

U.S. patent application Ser. No. 13/588,769 titled "Multi-Standard Coverage Map Generation." filed on Aug. 17, 2012, and now patented as U.S. Pat. No. 9,026,118.

Each of the above referenced documents applications is hereby incorporated herein by reference in its entirety.

## FIELD OF THE INVENTION

Certain embodiments of the invention relate to signal processing. More specifically, certain embodiments of the invention relate to a method and system for spectrum monitoring.

## BACKGROUND OF THE INVENTION

Network-based services can become unacceptable if network parameters fall outside of those for which receivers in the network were designed. For example, in a cable television system there are specifications for the number of channels on the plant, the types of channels, the signal levels of those channels and the impairments that can be on the plant that would affect the performance of the receiver. If some or all of these parameters deviate outside acceptable bounds, the user may experience unacceptable performance. Conventional methods and apparatuses for monitoring network parameters are too costly and impractical for use in customer-premises equipment (CPE).

Further limitations and disadvantages of conventional and traditional approaches will become apparent to one of skill in the art, through comparison of such systems with some aspects of the present invention as set forth in the remainder of the present application with reference to the drawings.

## BRIEF SUMMARY OF THE INVENTION

A system and/or method is provided for spectrum monitoring, substantially as shown in and/or described in connection with at least one of the figures, as set forth more completely in the claims.



These and other advantages, aspects and novel features of the present invention, as well as details of an illustrated embodiment thereof, will be more fully understood from the following description and drawings.

## BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

FIG. **1**A depicts an example cable system in accordance with an example embodiment of the invention.

FIG. **1**B depicts an example receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention.

FIG. **1**C depicts an example satellite system in accordance with an example embodiment of the invention.

FIG. **2**A depicts an example RF front-end of a receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention.

FIG. **2**B depicts another example RF front-end of a receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention.

FIG. **3** depicts an example channelizer which may be utilized for performing spectrum monitoring in accordance with an example embodiment of the invention.

FIG. **4** is a flow chart illustrating example steps for spectrum monitoring in accordance with an example embodiment of the invention.

## DETAILED DESCRIPTION OF THE INVENTION

As utilized herein the terms "circuits" and "circuitry" refer to physical electronic components (i.e. hardware) and any software and/or firmware ("code") which may configure the hardware, be executed by the hardware, and or otherwise be associated with the hardware. As utilized herein, "and/or" means any one or more of the items in the list joined by "and/or". For example, "x and/or y" means any element of the three-element set { (x), (y), (x, y)}. Similarly, "x, y, and/or z" means any element of the seven-element set {(x), (y), (z), (x, y), (x, z), (y, z), (x, y, z)}. As utilized herein, the terms "block" and "module" refer to functions than can be implemented in hardware, software, firmware, or any combination of one or more thereof.

FIG. **1**A depicts an example communication system in accordance with an example embodiment of the invention. Shown in FIG. **1** is a terrestrial television antenna **102**, a satellite dish **104**, an Internet Protocol (IP) network **106**, a headend **108**, a wide area network (e.g., hybrid fiber-coaxial (HFC) network) **118**, a gateways **120***a* and **120***b*, end systems **126***a* and **126***b* (e.g., computers), and end systems **128***a* and **128***b*. The headend **108** comprises a switch **110**, a video modulator **112**, a cable modem termination system (CMTS) **114**, and a splitter/combiner **116**.

For downstream traffic, the headend **108** may receive television signals via the antenna **102** and the satellite dish **104**, and may receive data via the IP network **106**. The switch **110** may convey the television signals to the video modulator **112** and the data to the CMTS **114**. The video modulator **112** may modulate the received television signals onto a carrier. The CMTS **114** may modulate the received data onto a carrier. The splitter/combiner **116** may combine the outputs of the video modulator **112** and the CMTS **114** resulting in a frequency division multiplexed (FDM) signal comprising one or more television channels and/or one or more DOCSIS channels. The FDM signal may be onto the wide area network (WAN) **118** for distribution to customer

premise equipment (CPE). Each of the gateways **120***a* and **120***b* may comprise a receive module **150** operable to process the received FDM signal as described below.

In an example embodiment, each of the gateways **120***a* and **120***b* may be operable to transmit, via a module **152**, messages to the CMTS **114**. For such upstream data, the gateways **120***a* and **120***b* may modulate messages (e.g., network management/maintenance messages) onto one or more carriers for transmission via the WAN **118**. The splitter/combiner **116** may then convey the message to the CMTS **114**. The CMTS **114** may process the messages and, in an example embodiment, adjust transmission parameters (e.g., modulation parameters, transmit power, frequency offsets, etc.) and/or perform other maintenance/management based on the received messages.

FIG. 1B depicts an example receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention. Shown in FIG. 1B is a receiver circuit **100** comprising an RF receive front-end module **158**, a channelizer module **102**, a monitoring module **154**, and a data processing module **156**.

The RF receive front-end **158** may be operable to process a received RF signal S to generate a digital signal D. The signal S may be the result of a plurality of television and/or DOCSIS channels being frequency division multiplexed into a single signal. The signal S may occupy a frequency band from $F_{lo}$ to $F_{hi}$. The RF front-end **158** may, for example, amplify, down-convert, filter, and/or digitize the received signal S to generate the digital signal D. Example embodiments of the RF front-end are depicted in FIGS. **2**A and **2**B.

The channelizer **102** may be operable to select J+1 bands (represented as $C_1$-$C_{J+1}$) of the signal S and output each of the selected bands to the monitoring module **154** and/or the data processing module **156**, where J is an integer greater than 1. An example embodiment of the channelizer **102** is depicted in FIG. **3**. Each band $C_j$ may, for example, correspond to the frequency band of one or more television channels. For example, each band $C_j$ may be an integer multiple of 6 MHz (U.S.) or 8 MHz (EU).

In an example embodiment, the channelizer **102** may be implemented entirely in the digital domain and the channelization may be achieved via one or more digital filtering algorithms and/or other digital signal processing algorithms.

The monitoring module **154** may be operable to analyze the band $C_{J+1}$ that it receives from the channelizer **102** to measure/determine characteristics such as, for example, signal power level vs. frequency, delay vs. frequency, phase shift vs. frequency, type and/or amount of modulation, code rate, interference levels, signal to noise ratio, a transfer function of the channel of over which the signal was received, an impulse response of the channel over which the signal was received, and/or any other characteristic that may help assess characteristics of the channel over which the signal was received, assess characteristics of the transmitter that sent the signal and/or any otherwise be pertinent to performance of the communication system. The monitoring module may also be operable to generate one or more control signals **160** for configuring the channelizer **102** and/or for configuring the RF front-end **158**. Additionally or alternatively, the control signal(s) **160** output by the monitoring module **154** may control the transmission of network management/maintenance messages by the device **150**. Such message may comprise, for example, network status updates indicating whether one or more communication parameters of one or more received television or DOCSIS channels are outside acceptable bounds, and/or conveying measured/determined characteristics back to a source of the received signal (e.g., back to a cable headend), In an example embodiment, the monitoring module **174** may be operable to demodulate signals for measuring one or more characteristics such as signal-to-noise ratio, code rate.

The data processing module **156** may be operable to process the bands $C_1$-$C_J$ conveyed to it by the channelizer **102** to recover data present in one or more television channels present in those bands of the signal S. The data processing module **156** may, for example, perform synchronization, equalization, and decoding. The data processing module **156** may output processed data (e.g., MPEG transport stream packets and/or Internet Protocol packets) to end systems **126**, perhaps via an interface such as an HDMI interface and/or an Ethernet interface (not shown). The data processing module **156** may also be operable to generate one or more control signals **162** for configuring the channelizer **102** and/or the receive front-end **158**.

The parallel arrangement of the monitoring module **154** and data processing module **156** may enable determination of signal and/or channel characteristics without having to interrupt service to user equipment **126** and **128**.

In an example embodiment, the signal S may be a cable television signal with $F_{lo}$≈55 MHz, $F_{hi}$≈1002 MHz. In an example embodiment, the signal S may be a MoCA signal with $F_{lo}$≈1150 MHz and $F_{hi}$≈2100 MHz. These numbers are purely for illustration and not intended to be limiting.

In an example embodiment, the signal S may be a satellite television signal such as may be at the input of a LNB, at the output of a LNB, or at the input of a indoor unit (e.g., set top box). In such an embodiment, the front-end **158**, channelizer **152**, data processing module **154**, and/or monitoring module **154** may reside in the indoor unit (e.g., set-top box), outdoor unit (e.g., satellite dish or accompanying components), and/or may be distributed among the indoor unit and outdoor unit of a satellite installation residing at a customer premises. An example of such an embodiment is shown in FIG. **1**C.

In operation of such an example embodiment, the signal S may be amplified, possibly downconverted, and digitized by the RF front-end **158** to generate the signal D. The channelizer **102** may then select J bands of the signal D for output to the data processing module **156**. Each of the selected bands $C_1$-$C_J$ may, for example, comprise one or more of the cable television channels and/or one or more of the DOCSIS channels that make up the signal S. The data processing module **156** may provide one or more control signals to determine which portion of the signal D is selected for each of the bands $C_1$-$C_J$. The selection may be based, for example, on which television channels are being consumed by end systems **128** and/or whether DOCSIS data is being consumed by end systems **126**. The channelizer **102** may also select one band, represented as band $C_{J+1}$, to be output to the monitoring module **154**. Band $C_{J+1}$ may comprise any portion or portions (including the entire bandwidth from $F_{lo}$ to $F_{hi}$) of the signal D. Which portion of the signal S is selected as band $C_{J+1}$ may, for example, be configured by the monitoring module **154**. The data processing module **156** may process one or more of bands $C_1$-$C_J$ to recover data on one or more channels (e.g., television and/or DOCSIS channels) present in those bands while the monitoring module **154** may concurrently process band $C_{J+1}$ to measure/determine characteristics of all or a portion of the signal S between $f_{lo}$ and $f_{hi}$.

FIG. **1**C depicts an example satellite system in accordance with an example embodiment of the invention. Shown in FIG. **1**C is a satellite dish assembly **172**, and a gateway **196**.

The subassembly **174** comprises a feed horn **182**, an LNB **194**, the front-end **158**, the channelizer **152**, the monitoring module **154**, and the data processing module **156**. The various modules of the subassembly **174** may reside in one or more housings, on one or more printed circuit boards, and/or one or more integrated circuits (e.g., one or more silicon dice). In another example embodiment, the monitoring module **154** and/or the data processing module **156** may reside in the gateway **196**.

In the example embodiment depicted, the satellite dish assembly **172** comprises a parabolic reflector **176** and a subassembly **174** mounted (e.g., bolted or welded) to a support structure **178** which, in turn, comprises a boom **190** and attaches (e.g., via bolts) to the premises **180** (e.g., to the roof). In another example embodiment, all or a portion of the modules **152**, **154**, and/or **156** may be mounted to the premises **180** separate from the satellite dish (e.g., connected via wired and/or wireless connections), but may still be part of the "outdoor unit."

The gateway **196** may receive data from the satellite dish assembly **172** (via cable(s) **184**). The gateway and may transmit data onto and receive data from the WAN **192** (via broadband connection **188**). The gateway **196** may transmit data to and receive data from user equipment **128** and **126** (via one or more connections **186**).

FIG. **2**A depicts an example RF front-end of a receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention. The RF front-end **158**A shown in FIG. **2**A comprises a variable gain amplifier **202**, and receive chains $\mathbf{204}_1$-$\mathbf{204}_L$, where L is an integer greater than or equal to 1. Each receive chains $\mathbf{204}_1$ may comprise an amplifier module $\mathbf{210}_1$, a mixer module $\mathbf{212}_1$, a filter module $\mathbf{214}_1$, and an analog-to-digital converter (ADC) module $\mathbf{216}_1$, where 1 is an integer between 1 and L.

Each amplifier $\mathbf{210}_1$ may be operable to amplify a band 1 of the signal S. Each mixer $\mathbf{212}_1$ may be operable to mix a band 1 of the signal S with a local oscillator signal (not shown) to downconvert the band 1 to a lower frequency. Each filter module $\mathbf{214}_1$ may be operable to bandpass filter the band 1 to remove/attenuate frequencies outside band 1. Each ADC **216** may be operable to convert the band 1 of the analog signal S to a corresponding digital representation. Operation of the RF front-end **158** and/or processing of signals generated by the front-end **158**, may, for example, be as described in U.S. patent application Ser. No. 13/336,451 entitled "Method and Apparatus for Broadband Data Conversion" which is incorporated by reference herein, as set forth above.

In an example embodiment, the front-end **158**A may reside in a cable gateway such as the cable gateway **120** described above. In an example embodiment, the front-end **158**A may reside in satellite gateway/set-top box and/or in an outdoor unit of a satellite reception assembly (e.g., collocated on-chip or on-PCB with a satellite low-noise block downconverter (LNB)).

FIG. **2**B depicts another example RF front-end of a receiver operable to perform spectrum monitoring in accordance with an example embodiment of the invention. The RF front-end **158**B shown in FIG. **2**B comprises a variable gain amplifier **252**, a filter **254**, and an ADC **256**. Functions performed by the RF front-end **158**B may be referred to as "full-spectrum capture" (or "FSC").

In the front-end **158**B, the entire bandwidth, from $F_{lo}$ to $F_{hi}$, of signal S may be amplified by the amplifier **252** to generate S'. The amplified signal S' may be then filtered by the filter **254** to remove undesired signals outside of $F_{lo}$ to $F_{hi}$ and generate signal S". The signal S", from $F_{lo}$ to $F_{hi}$, may then be digitized by the ADC **256** to generate signal D. In an example embodiment, the ADC may be as described in U.S. patent application Ser. No. 13/485,003 entitled "Multi-layer Time-Interleaved Analog-to-Digital Converter (ADC)," which is incorporated by reference herein, as set forth above.

In an example embodiment, the ADC **256** may be capable of digitizing a signal S wherein $F_{lo}$ to $F_{hi}$ is 1 GHz or higher. Accordingly, for cable television/DOCSIS, the ADC **256** may be operable to digitize the entire cable downstream (e.g., from ~55 MHz to ~1002 MHz). Similarly, for satellite television, the ADC **256** may be operable to digitize the received signal at the input of the LNB, and/or the down-converted signal (e.g., from ~1 GHz to ~2 GHz) at the output by an LNB.

FIG. **3** depicts an example channelizer which may be utilized for performing spectrum monitoring in accordance with an example embodiment of the invention. Band selection filters $\mathbf{302}_1$-$\mathbf{302}_J$ of the channelizer **102** may each process the signal D to recover a corresponding one of the J selected bands of the signal D, and output the band on a corresponding one of the ports $\mathbf{304}_1$ to $\mathbf{304}_J$. A band selection filter $\mathbf{302}_{J+1}$ of the channelizer **102** may process the signal D to recover band $C_{J+1}$ from the signal D, and output band $C_{J+1}$ on the port $\mathbf{304}_{J+1}$. Which band or bands are selected by the filter $\mathbf{302}_{J+1}$ may be configured based on one or more control signals input to the channelizer **102**. For example, the value of a parameter k may determine the center frequency of the portion of signal D that is to be selected as $C_{J+1}$ by the filter $\mathbf{302}_{J+1}$, and the value of Δ may determine the bandwidth of the portion of this signal D that is selected as band $C_{J+1}$ for output on the port $\mathbf{304}_{J+1}$. In this manner, all of the signal D between $F_{lo}$ and $F_{hi}$ or any portion or portions of the signal D, may be selected for output on the port $\mathbf{304}_{J+1}$.

FIG. **4** is a flow chart illustrating example steps for spectrum monitoring in accordance with an example embodiment of the invention. After start step **402**, in step **404**, the receiver circuit **100** may receive a frequency division multiplexed (FDM) signal comprising one or more channels (e.g., satellite television channels, cable television channels, and/or DOCSIS channels) occupying a frequency band between $F_{lo}$ and $F_{hi}$. In step **406**, the received FDM signal is digitized across the full band from $F_{lo}$ to $F_{hi}$. In step **408**, the digitized signal is channelized into one or more bands. In step **410**, a first one or more of the bands are conveyed to a data processing module. In step **412** a second one or more of the bands are output to a monitoring module. In step **414**, the data processing module processes one or more of the first one or more bands to recover data on those bands while the monitoring module concurrently processes the second one or more bands to determine characteristics of all or a portion of the frequency band from $F_{lo}$ to $F_{hi}$.

Other embodiments of the invention may provide a non-transitory computer readable medium and/or storage medium, and/or a non-transitory machine readable medium and/or storage medium, having stored thereon, a machine code and/or a computer program having at least one code section executable by a machine and/or a computer, thereby causing the machine and/or computer to perform the steps as described herein for spectrum monitoring

Accordingly, the present invention may be realized in hardware, software, or a combination of hardware and software. The present invention may be realized in a centralized fashion in at least one computing system, or in a distributed fashion where different elements are spread across several interconnected computing systems. Any kind

of computing system or other apparatus adapted for carrying out the methods described herein is suited. A typical combination of hardware and software may be a general-purpose computing system with a program or other code that, when being loaded and executed, controls the computing system such that it carries out the methods described herein. Another typical implementation may comprise an application specific integrated circuit or chip.

The present invention may also be embedded in a computer program product, which comprises all the features enabling the implementation of the methods described herein, and which when loaded in a computer system is able to carry out these methods. Computer program in the present context means any expression, in any language, code or notation, of a set of instructions intended to cause a system having an information processing capability to perform a particular function either directly or after either or both of the following: a) conversion to another language, code or notation; b) reproduction in a different material form.

While the present invention has been described with reference to certain embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the scope of the present invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the present invention without departing from its scope. Therefore, it is intended that the present invention not be limited to the particular embodiment disclosed, but that the present invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

**1**. A method comprising:

performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network:

receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels;

digitizing said received signal to generate a digitized signal;

selecting a first portion of said digitized signal;

selecting a second portion of said digitized signal;

processing said selected second portion of said digitized signal to recover information carried in said plurality of channels;

analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal; and

controlling the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.

**2**. The method of claim **1**, wherein said network management messages indicate whether a parameter is outside of acceptable bounds.

**3**. The method of claim **2**, wherein said parameter is a modulation parameter of said received signal.

**4**. The method of claim **2**, wherein said parameter is a transmit power of said received signal.

**5**. The method of claim **2**, wherein said parameter is a frequency offset of said received signal.

**6**. The method of claim **1**, wherein said characteristic is signal power vs. frequency.

**7**. The method of claim **1**, wherein said characteristics is signal phase vs. frequency.

**8**. The method of claim **1**, wherein said characteristic is one of: signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.

**9**. The method of claim **1**, configuring, by said one or more circuits, a bandwidth and/or center frequency of said selected first portion of said digitized signal.

**10**. A system comprising:

a receiver configured to be coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network, the receiver comprising:

front-end circuitry operable to:

receive a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels; and

digitize said received signal to generate a digitized signal;

channelizer circuitry operable to:

select a first portion of said digitized signal; and

select a second portion of said digitized signal;

processing circuitry operable to process said selected second portion of said digitized signal to recover information carried in said plurality of channels;

monitoring circuitry operable to:

analyze said selected first portion of said digitized signal to measure a characteristic of said received signal; and

control the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.

**11**. The system of claim **10**, wherein said network management messages indicate whether a parameter is outside of acceptable bounds.

**12**. The system of claim **11**, wherein said parameter is a modulation parameter of said received signal.

**13**. The system of claim **11**, wherein said parameter is a transmit power of said received signal.

**14**. The system of claim **11**, wherein said parameter is a frequency offset of said received signal.

**15**. The method of claim **1**, wherein said characteristic is signal power vs. frequency.

**16**. The method of claim **1**, wherein said characteristics is signal phase vs. frequency.

**17**. The system of claim **10**, wherein said characteristic is one of: signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.

**18**. The system of claim **10**, comprising configuring, by said monitoring circuitry during operation of said one or more circuits, a bandwidth and/or center frequency of said selected first portion of said digitized signal.

* * * * *

# EXHIBIT 4

US008284690B2

(12) **United States Patent**
**Barr**

(10) **Patent No.: US 8,284,690 B2**
(45) **Date of Patent: Oct. 9, 2012**

(54) **RECEIVER DETERMINED PROBE**

(75) Inventor: **David Barr**, San Jose, CA (US)

(73) Assignee: **Entropic Communications, Inc.**, San Diego, CA (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 253 days.

(21) Appl. No.: **12/635,649**

(22) Filed: **Dec. 10, 2009**

(65) **Prior Publication Data**

US 2010/0150016 A1 Jun. 17, 2010

**Related U.S. Application Data**

(60) Provisional application No. 61/122,687, filed on Dec. 15, 2008, provisional application No. 61/179,454, filed on May 19, 2009.

(51) **Int. Cl.**
***G06F 11/00*** (2006.01)
*G06F 15/173* (2006.01)

(52) **U.S. Cl.** ..... **370/252**; 709/224

(58) **Field of Classification Search** ..... None
See application file for complete search history.

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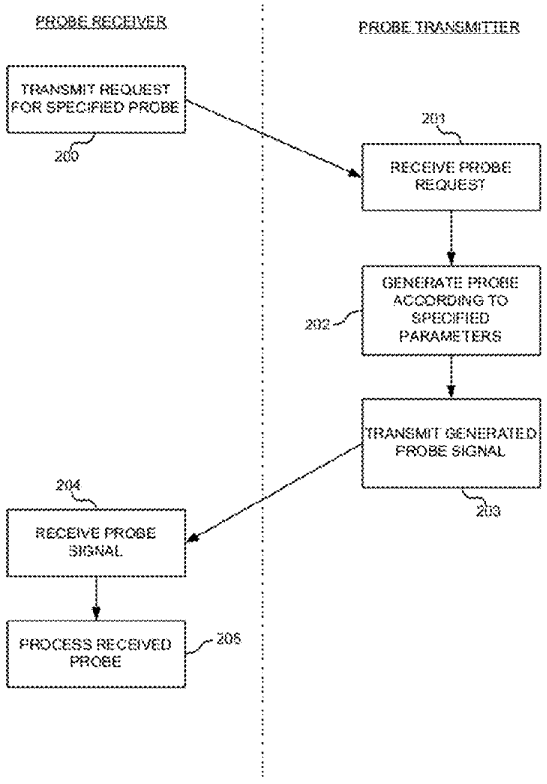
*Primary Examiner* — Clemence Han
(74) *Attorney, Agent, or Firm* — Bruce W. Greenhaus; Daniel Yannuzzi; Michael Febbo

(57) **ABSTRACT**

According to various embodiments of the disclosed method and apparatus, nodes on a network are programmed to generate a probe transmission in response to a request from the node that will be receiving the probe. The receiving node may generate a probe request that specifies a plurality of parameters, such as a modulation profile for the probe; the payload content of the probe; the number of times to transmit the probe; a number of symbols for the payload of the probe; a preamble type for the probe; a cyclic-prefix length for the payload of the probe; a transmit power for the probe; and a transmit power scaling factor for the payload of the probe.

**24 Claims, 6 Drawing Sheets**



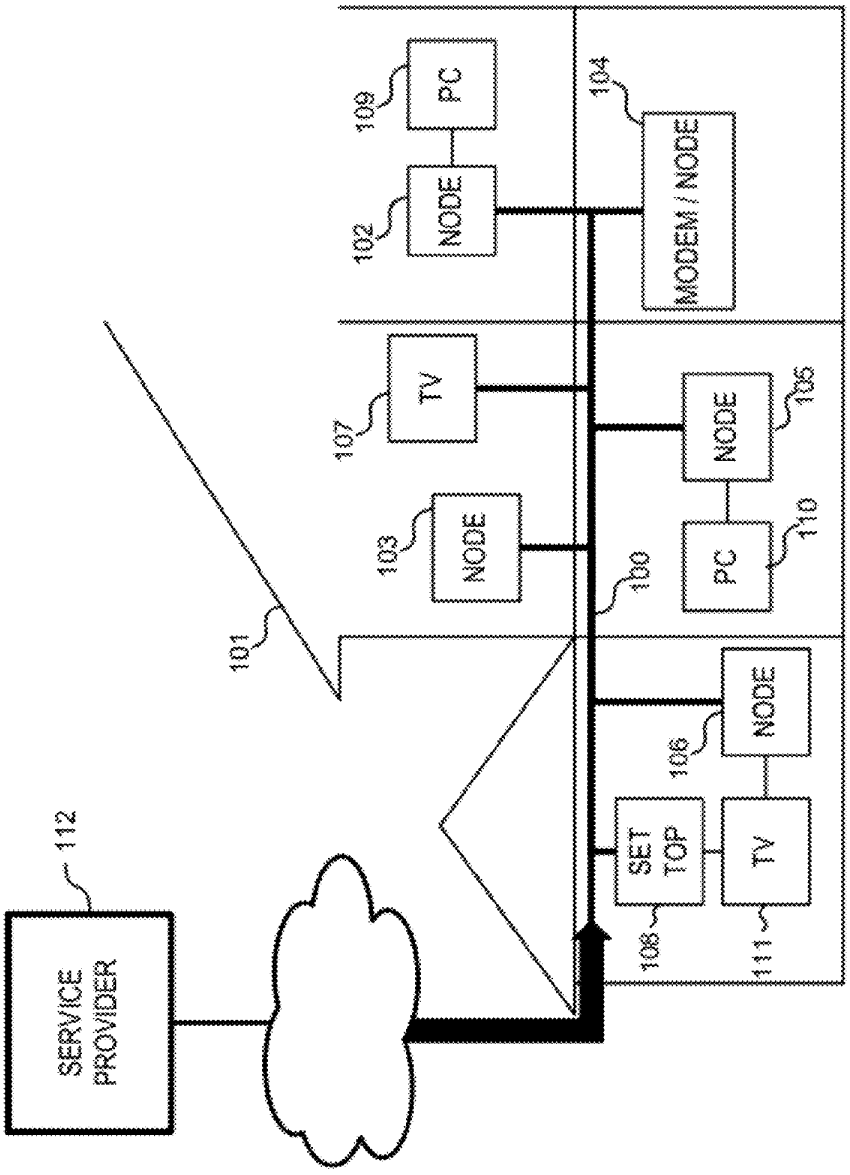
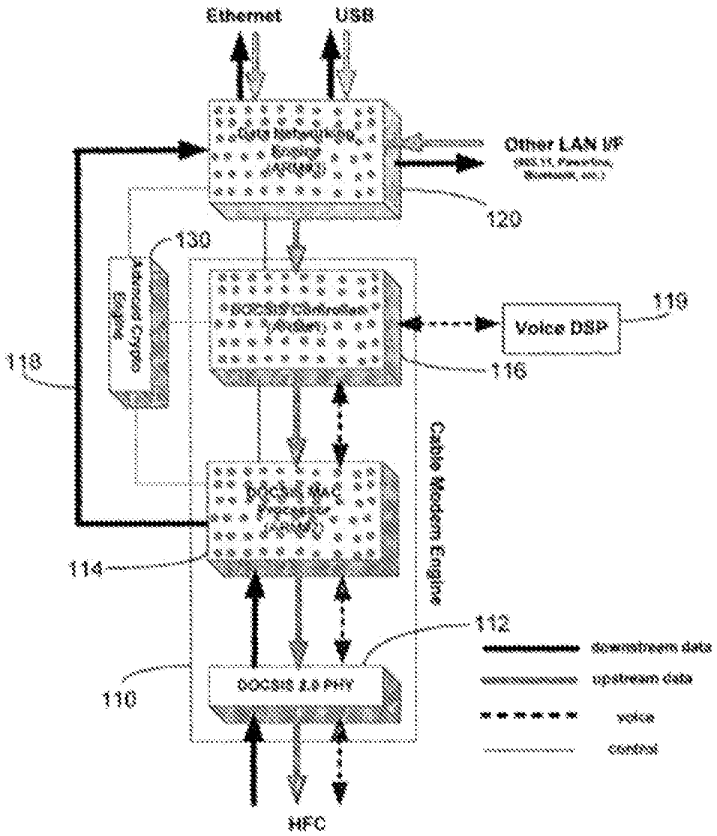
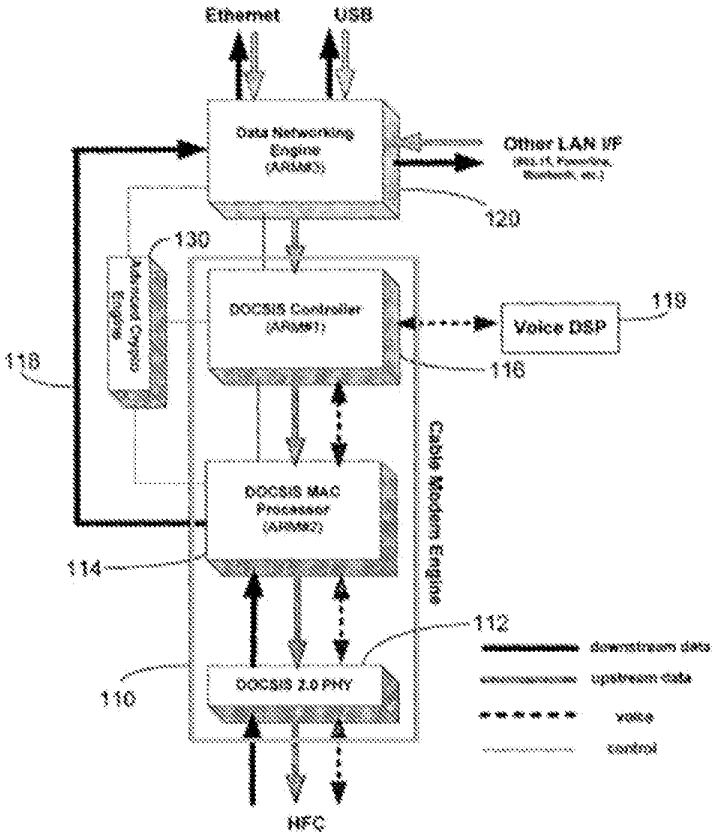

SERVICE PROVIDER
112
101
100
PC
109
NODE
102
MODEM / NODE
104
TV
107
NODE
103
NODE
106
PC
110
NODE
106
SET TOP
108
TV
111

*Fig. 1*




72. Applying this meaning of "circuit," the disclosed "cable modem engine" is implemented in billions of different circuits, as is the disclosed "data networking engine." The claim 18 requirement that the data networking engine be implemented "in a first circuit" would not be satisfied. Nor would the claim 18 requirement that the cable modem engine be implemented "in a second circuit."

73. I note that Figure 1 depicts a box drawn around all of the components of the CME. I highlight this box in purple below:




74. The specification does not explain what this box is. If it is intended to refer to a circuit *board* on which all of the components of the CME are placed – meaning the DNE is not implemented on the same physical circuit board as the DNE – then under one meaning of "circuit" the DNE and the CME can be deemed to be implemented in a first circuit and a second circuit, respectively (the "first circuit" and "second circuit" would be separate circuit boards). If the DNE and CME are not implemented on different physical circuit boards, however, there is no meaning of "circuit" pursuant to which the disclosed DNE is "implemented in a first circuit" and the disclosed CME is "implemented in a second circuit."

75. Because the specification does not explain which of the mutually-exclusive meanings of "circuit" to apply to claim 18, the scope of the claim is indefinite. There is no way to tell whether any particular device is made up of only one circuit, of two circuits or of billions of

circuits. Indeed, as demonstrated above, there is no way tell even if the disclosed cable modem embodiment satisfies claim 18.

76. Claim 18 also requires that the claimed cable modem engine include both a "DOCSIS MAC processor" and a "DOCSIS controller." As I explained in paragraphs 45 and 49 above, these terms do not have a plain and ordinary meaning in the art, and a POSITA would understand that, in the context of '775 Patent, these terms refer to the DOCSIS MAC processor described in the specification (*see, e.g.*, '775 Patent, 3:1-20; 4:41-57; Figures 1 & 2) and the DOCSIS controller described in the specification (*see, e.g.*, *id.*, 3:21-48; 4:41-57; Figures 1 & 2). Otherwise, the claim is indefinite for the additional reason that there would be no way to know what "DOCSIS MAC processor" and "DOCSIS controller" mean, or whether an accused cable modem contains one or both of these devices.

77. To understand the scope of claim 18, it is important to understand not just what a "DOCSIS MAC processor" is and what a "DOCSIS controller" is, but also what their boundaries are. This is because the claim requires that "the DOCSIS MAC processor [be] configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput" (*Id.*, 8:18-22.) This is the aspect of the alleged invention I explained in paragraphs 54-56 above, whereby downstream data is sent directly to the DNE by the DOCSIS MAC processor, bypassing the DOCSIS controller. Unless one understands where the DOCSIS MAC processor ends and the DOCSIS controller begins, one would not be able to ascertain whether an accused cable modem has a "DOCSIS MAC processor" which processes downstream packets "without the involvement of the DOCSIS controller."

78. Claim 18 is also indefinite because it requires "a cable modem engine … *that*

*includes at least one processor.*" ('775 Patent, 8:5-6 (emphasis mine).) My understanding is that this would cover a cable modem engine that includes only one processor. However, the claim also expressly requires that the cable modem engine contain a DOCSIS MAC processor and a DOCSIS controller, both of which (as I explain in paragraphs 47 and 50 above) are ARM processors. Thus, the claim is indefinite for the additional reason that the claim covers cable modem engines that contain only one processor, but that would be impossible in view of the requirement that the claim also requires that the CME contain both a DOCSIS MAC processor and a DOCSIS controller.

79. Finally, claim 18 requires a "data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine." (*Id.*, 8:23-27.) This limitation renders the claim indefinite, as the "wherein" clause is incompatible with the requirement that a data bus connect the DNE and CME. As explained in paragraphs 57-63 above, the applicant successfully argued that a DNE and CME are not "completely partitioned" if they share "connecting circuitry" or "data paths." The "data bus" as claimed would be shared "connecting circuitry" and a shared "data path."

## VI. THE '690 PATENT

### A. The Disclosure of the '690 Patent

80. The '690 Patent is titled "Receiver Determined Probe." According to the specification, in the prior art, probes having a predefined form would be sent "between nodes of the network in order to allow a receiving node on the network to determine some of the characteristics of the channel between the receiving node and the transmitting node." ('690 Patent, 1:48-53.) "By comparing the reference probe with the actual received probe, the receiver can determine some of the characteristics of the channel between the transmitting and receiving node." (*Id.*, 1:54-57.)

81. The problem with the prior art, according to the specification, is the fact that the

probes have a predetermined form. "[R]equiring the transmitting node to send a predetermined probe reduces the amount flexibility .... Nonetheless, this reduction in the flexibility must be suffered because it is critical to the process that the receiving node knows the precise form of the transmitted probe." (*Id.*, 1:57-62.)

82. The purported solution to this problem, as the title of the patent suggests, is a "receiver determined probe." The probes do not have a predefined form. Instead, the receiver of the probe determines the form of the probe that it wants to receive. The receiving node sends a "probe request" to a transmitting node which contains "parameters" that define the form of the probe the receiving node wants to receive. The transmitter of the probe then generates the probe according to those parameters. As such, the probe that is generated by the transmitting node "will have a form dictated by the parameters specified in the probe request." (*Id.*, 1:66-2:19.)

**B. Claims 1 and 9 of the '690 Patent**

83. Unlike the disclosure of the '690 Patent, wherein the receiving node (which can also be referred to as the "requesting node" since it sends the probe request) sends the parameters used to generate the probe, claims 1 and 9 of the '690 Patent require that both the requesting node and the transmitting node separately determine a "plurality of parameters associated with the generation" of the probe. (*Id.*, 13:46-48; 13:51-52; 14:19-21; 14:26-28.) Both claims also require that the probe actually be generated "in accordance with" both the plurality of parameters sent by the requesting node (the "first plurality of parameters") and the plurality of parameters determined by the transmitting node (the "second plurality of parameters"). (*Id.*, 13:53-54; 14:25-28).

84. However, claim 1 requires that the form of the probe be "dictated by the first plurality of parameters" (*Id.*, 13:55-56.) Similarly, claim 9 requires that the "first plurality of probe parameters compris[e] a form for the probe." (claim 9, *Id.*, 14:21-23.) Neither requirement makes any mention of the second plurality of parameters. From this language, the claims appear to cover the form of the

probe being determined only by the parameters sent by the requesting node. This renders the claim indefinite. By definition, "parameters" define the form of the probe that will be generated. (*Id.*, 2:6.) If the "first plurality of parameters" alone determine the form of the probe, then the probe cannot be generated "in accordance with" the second plurality of parameters as required by this other limitation in the claims.

## VII. THE '682 PATENT

### A. The Disclosure of the '682 Patent

85. The '682 Patent is titled "Method And System For Service Group Management In A Cable Network." Pursuant to disclosed embodiments, a CMTS assigns each cable modem to a service group based on the cable modem's signal to noise ratio ("SNR") profile. The CMTS then uses a "composite worst-case SNR profile" for each service group to determine how it will communicate with the cable modems in each service group respectively. I will explain this below.

86. A SNR is the ratio of the signal level to the noise level. The higher the SNR the greater the ratio of signal to noise. Greater signal and less noise is better, as noise interferes with the ability to understand or properly interpret the signal that is received. (Appx. I, Excerpted Newton's Telecom Dictionary (20th Ed. 2004), at 747.)

87. An "SNR over a range of frequencies" is an "SNR profile." ('682 Patent, 3:57-58.) Each band of frequencies for which the SNR is measured is referred to as a "subcarrier" or "channel." (*Id.*, 4:7-8.) Thus, line 222 in Fig 2B of the '682 Patent (reproduced below) can be the SNR profile of a single cable modem over the range of frequencies from subcarrier 1 ("sub1") to subcarrier 8 ("sub8") (*Id.*, 4:7-8; 4:11-13.) I have included explanatory annotations to the figure in which I assume that line 222 is the SNR profile for a hypothetical cable modem "A" ("CM[A]"). Each step in line 222 is the SNR of CM[A] at one of the subcarriers:

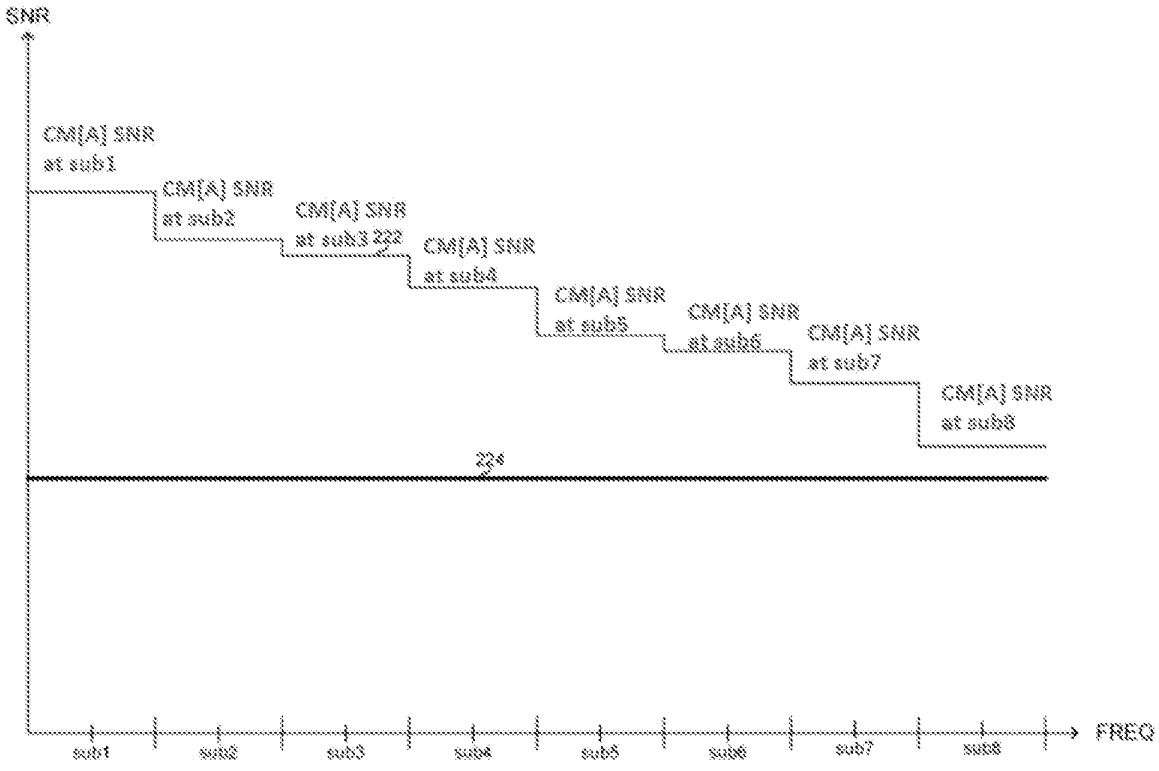



FIG. 2B

88. Each cable modem determines its own SNR profile (*Id.*, 5:34-35) and sends that SNR profile to the CMTS. (*Id.*, 5:36-37; Figure 3A step 304.) Pursuant to disclosed embodiments, a CMTS assigns each cable modem to a service group based on the cable modem's SNR profile. (*Id.*, 5:37-39; Figure 3A step 306.)

89. The CMTS then uses a so-called "composite worst-case SNR profile" for each service group to determine how it will communicate with the cable modems in that service group. (*Id.*, 4:9-11; 5:7-12; 5:40-41.) The "composite worst-case SNR profile" for a service group is "the worst case SNR for [each] subcarrier among the CMs in that particular service group." (*Id.*, 5:42-46.)

90. Thus, if there are 5 cable modems (CM[A] - CM[E]) in a hypothetical service group, the "composite worst-case SNR profile" for that service group reflects the worst SNR of all the cable modems in the service group for each subcarrier. I annotate Fig 2B of the '682 Patent to demonstrate

this example. In this example, CM[A] has the worst SNR at subcarriers 2, 5 and 7, CM[B] has the worst SNR at subcarrier 1, CM[C] has the worst SNR at subcarrier 6, CM[D] has the worst SNR at subcarriers 3 and 8, and CM[E] has the worst SNR at subcarrier 4:

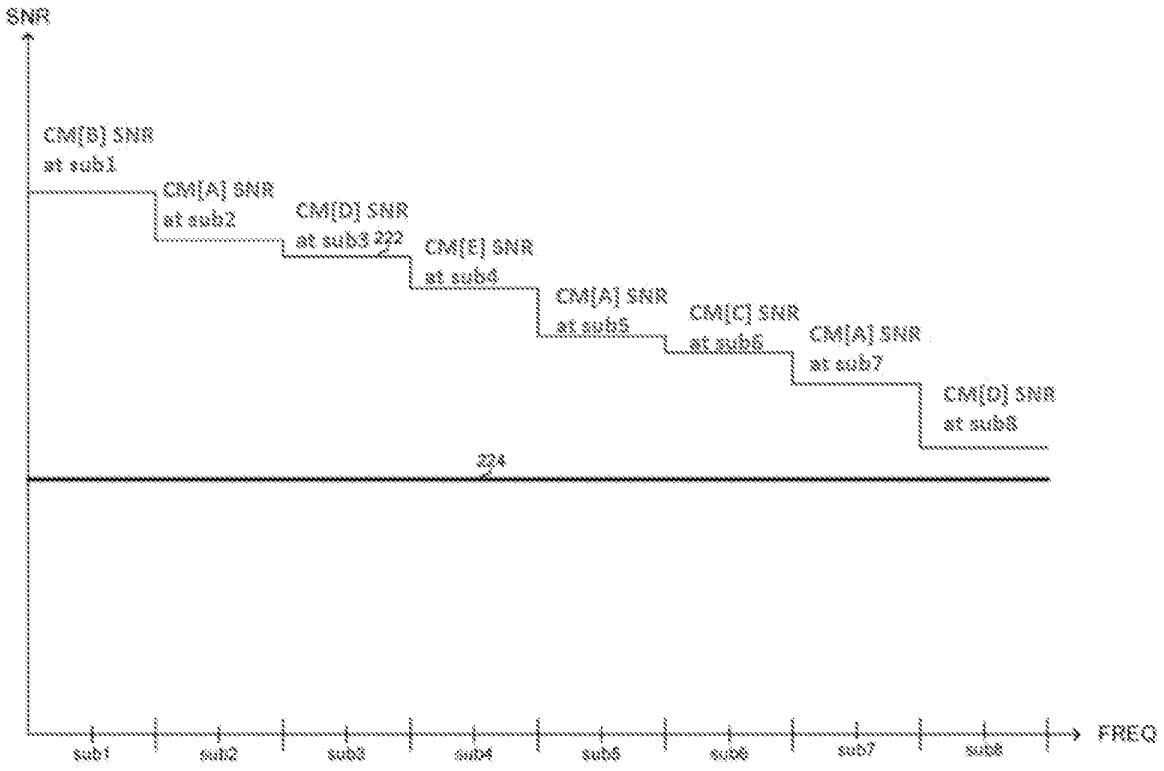



FIG. 2B

91. The need for such a "composite worst-case SNR profile" for each service group stems from the fact that "physical layer communication parameters are determined per service group and per channel/subcarrier." (*Id.*, 5:40-41). In other words, if communication parameters for a subcarrier are selected to accommodate the cable modem having the worst case SNR in the service group, all other CMs in the service group (having better SNRs) will be able to accommodate those communication parameters as well.

92. I note that the phrase "composite worst-case SNR profile" does not have a plain and

ordinary meaning in the art.

**B. Claim 1 of the'682 Patent**

93. Claim 1 of the '682 Patent does not recite a "composite worst-case SNR profile" for the cable modems in a service group. Instead, it requires generating "a composite SNR-related metric based at least in part on a worst-case SNR profile…" for the cable modems in a service group (*Id.*, 8:12-15.) In other words, a "composite SNR-related metric" is generated from a "worst-case SNR profile," such that the former is in some way "based at least in part on" the latter. As I will explain, this renders the claim indefinite because the "composite SNR-related metric" and the "worst-case SNR profile" must both refer to the disclosed "composite worst-case SNR profile" described in paragraphs 89-92 above.

94. "Worst-case SNR profile" does not have a plain and ordinary meaning in the art. Since the "worst case" SNR is always an SNR of 0, a POSITA seeing the term "worst-case SNR profile" would most likely assume it is an SNR "profile" containing only 0s. In this event, the claim phrase "worst-case SNR profile of said SNR-related metrics…" would be unintelligible. Thus, a POSITA would look to the specification for a meaning of "worst-case SNR profile." As I explain in paragraph 89 above, the specification explains that a "*composite* worst-case SNR profile" for a service group is "the worst case SNR for [each] subcarrier among the CMs in that particular service group." As such, a POSITA would interpret "worst-case SNR profile" as referring to the "composite worst-case SNR profile" described in the specification. Otherwise, the claim is indefinite for the additional reason that there is no way to tell what a "worst-case SNR profile" is.

95. The phrase "composite SNR-related metric" does not have a plain and ordinary meaning in the art and is not used in the specification. However, the specification teaches that an example of a "composite metric" would be a "composite SNR profile." (4:47-49) In view of the

specification, then, a POSITA would understand the claimed "composite *SNR-related* metric" to refer to that "composite SNR profile." And in the specification, the phrase "composite SNR profile" is used as shorthand for "composite worst-case SNR profile" (see e.g. 5:40-6:6 and Fig. 3A; a composite worst case SNR profile is used (5:4-46), which is synonymously referred to as a "composite SNR profile" (Fig. 3A step 308)). Thus, the only meaning a POSITA could ascribe to the claim phrase "composite SNR-related metric" is "composite worst-case SNR profile." Otherwise, the claim is indefinite for the additional reason that there is no way to tell what a "composite SNR-related metric" is.

96. Because "composite SNR-related metric" and "worst-case SNR profile" must both refer to the "composite worst-case SNR profile," however, the claim is indefinite. There is no way to know how the "composite SNR-related metric" can be "based *at least in part on*" the "worst-case SNR profile" since the two refer to the same thing.

97. In addition, although the claimed cable modems are assigned "among a plurality of service groups" (*id.*, 8:7-8), the claim then requires that a number of steps be performed with respect to a particular "said one of said plurality of service groups." (*Id.*, 8:18; 8:21-22.) There is no antecedent in the claim for "said one of said plurality of service groups," and there is no way to know which one service group among the "plurality of service groups" is being referred to. Claim 1 is therefore indefinite for this additional reason.

## VIII. RESERVATION OF RIGHTS

98. I reserve the right to respond to any evidence (including expert opinions) that Plaintiff Entropic Communications, LLC may offer in support of its claim construction positions.

* * *

I declare under penalty of perjury that the foregoing is true and correct.

Dated: April 4, 2023

Kevin C. Almeroth, Ph.D.

# Appendix A

# Kevin C. Almeroth

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## Education

| | | | |
|---|---|---|---|
| **Ph.D.** | June 1997 | *Georgia Institute of Technology* | Computer Science |
| | | *Dissertation Title*: Networking and System Support for the Efficient, Scalable Delivery of Services in Interactive Multimedia Systems | |
| | | *Minor*: Telecommunications Public Policy | |
| **M.S.** | June 1994 | *Georgia Institute of Technology* | Computer Science |
| | | *Specialization*: Networking and Systems | |
| **B.S.** | June 1992 | *Georgia Institute of Technology* | Information and Computer Science |
| **(high honors)** | | *Minors*: Economics, Technical Communication, American Literature | |

## Employment History

| | | |
|---|---|---|
| Professor Emeritus | Department of Computer Science<br>University of California<br>Santa Barbara, CA | Nov 2020 -- present |
| Professor | Department of Computer Science<br>University of California<br>Santa Barbara, CA | Jul 2005 -- Oct 2020 |
| Associate Dean | College of Engineering<br>University of California<br>Santa Barbara, CA | Mar 2007 -- Aug 2009 |
| Vice Chair | Department of Computer Science<br>University of California<br>Santa Barbara, CA | Jul 2000 -- Nov 2005 |

| | | |
|---|---|---|
| Associate Professor | Department of Computer Science<br>University of California<br>Santa Barbara, CA | Jul 2001 -- Jun 2005 |
| Assistant Professor | Department of Computer Science<br>University of California<br>Santa Barbara, CA | Jul 1997 -- Jun 2001 |
| Graduate Researcher | Broadband Telecommunications Center<br>Georgia Center for Adv Telecom Tech<br>Atlanta, GA | Sep 1996--Jun 1997 |
| Graduate Intern | IBM<br>T.J. Watson Research Labs<br>Hawthorne, NY | Jun 1995--Sep 1995 |
| Support Specialist | Office of Information Technology<br>Georgia Institute of Technology<br>Atlanta, GA | Sep 1995--Jun 1997 |
| Research Assistant | College of Computing<br>Georgia Institute of Technology<br>Atlanta, GA | Jan 1994--Mar 1994 |
| Graduate Intern | Hitachi Telecommunications<br>Norcross, GA | Jun 1992--Sep 1992 |
| Undergraduate Intern | IBM<br>Research Triangle Park, NC | Jun 1989--Sep 1989<br>Jun 1990--Sep 1990<br>Mar 1991--Sep 1991 |

## Industry Technical Advising

| | | |
|---|---|---|
| Board of Directors | The New Media Studio<br>Santa Barbara, CA | Nov 2006 -- present |
| Co-Founder &<br>Chairman of the Board | Santa Barbara Labs, LLC<br>Santa Barbara, CA | Sep 2007 -- Dec 2009 |
| Board of Advisors | Techknowledge Point<br>Santa Barbara, CA | May 2001 -- Dec 2007 |
| Technical Advisory Board | Occam Networks, Inc.<br>Santa Barbara, CA | May 2000 -- Dec 2010 |
| Board of Advisors | Airplay Inc.<br>San Francisco, CA | Jun 2005 -- Aug 2009 |
| Consultant | Lockheed Martin Corporation<br>San Jose, CA | Nov 1999 -- Jun 2009 |

| | | |
|---|---|---|
| Board of Advisors | Santa Barbara Technology Group<br>Santa Barbara, CA | Sep 2000 --<br>Dec 2004 |
| Board of Directors | Virtual Bandwidth, Inc.<br>Santa Barbara, CA | Nov 2000 --<br>Jun 2001 |
| Board of Advisors &<br>Affiliated Scientist | Digital Fountain<br>San Francisco, CA | Jan 2000 --<br>Dec 2001 |
| Senior Technologist | IP Multicast Initiative, Stardust Forums<br>Campbell, CA | Jun 1998 --<br>Dec 2000 |

# I. Teaching

## A. Courses Taught

| | | |
|---|---|---|
| CS 176A | Intro to Computer Communication Networks | Fall 1997, Fall 1998, Fall 2002, Fall 2003, Fall 2004, Spring 2005, Spring 2006, Spring 2007, Spring 2008, Fall 2008, Fall 2009, Fall 2010, Fall 2011, Fall 2012, Fall 2013, Fall 2014, Spring 2017, Spring 2018, Spring 2020, Fall 2020 |
| CS 176B | Network Computing | Winter 2000, Winter 2001, Winter 2002, Winter 2012, Winter 2014, Winter 2015, Winter 2018, Winter 2019, Winter 2020 |
| MAT 201B | Media Networks and Services | Fall 1999, Fall 2000, Fall 2001, Fall 2003 |
| CS 276 | Distributed Computing and Computer Networks | Winter 1999, Spring 2000, Fall 2002, Fall 2005, Fall 2018 |
| CS 290I | Networking for Multimedia Systems | Winter 1998, Spring 1999, Fall 2004, Winter 2010 |
| CS 595N | Technology and Society | Winter 2005, Fall 2005, Spring 2006, Fall 2006, Spring 2007, Fall 2007, Spring 2008, Fall 2008, Spring 2009 |
| CS 595N | Economic Systems Seminar | Winter 2004, Spring 2004, Winter 2005, Spring 2005 |
| CS 595N | Networking Seminar | Winter 1999, Fall 1999, Winter 2003, Winter 2019 |
| CS 595N | Wireless Networking & Multimedia Seminar | Fall 2000 |
| CS 595I | Systems Design and Implementation Seminar | Fall 1999, Fall 2000, Winter 2001, Spring 2001, Winter 2002, Spring 2002 |

## B. Other Teaching Experience

- *The Evolution of Advanced Networking Services: From the ARPAnet to Internet2*, Instructor, Summer 2001. Short course taught at Escuela de Ciencias Informatica (ECI) sponsored by the Universidad de

Buenos Aires.

- *Johns Hopkins Center for Talented Youth*, Instructor, Summer 1994. CTY is a program to teach gifted high school students the fundamentals of computer science.

- *Georgia Institute of Technology*, Graduate Teaching Assistant, Sep 1994--Sep 1996. Worked as a TA for 12 quarters teaching 7 different courses (4 undergraduate and 3 graduate).

## C. Ph.D. Students Advised [14 graduated]

14. Daniel Havey
    Research Area: *Throughput and Delay on the Packet Switched Internet*
    Date Graduated: Winter 2015
    First Position: Microsoft
13. Lara Deek (co-advised with E. Belding)
    Research Area: *Resource-Efficient Wireless Systems for Emerging Wireless Networks*
    Date Graduated: Summer 2014
    First Position: Post Doc, UIUC
12. Mike Wittie
    Research Area: *Towards Sustained Scalability of Communication Networks*
    Date Graduated: Summer 2011
    First Position: Assistant Professor, Montana State University
11. Allan Knight
    Research Area: *Supporting Integration of Educational Technologies and Research of Their Effects on Learning*
    Date Graduated: Summer 2009
    First Position: Research Scientist, Citrix Online
10. Hangjin Zhang
    Research Area: *Towards Blended Learning: Educational Technology to Improve and Assess Teaching and Learning*
    Date Graduated: Spring 2009
    First Position: Microsoft
9. Gayatri Swamynathan
    Dissertation Title: *Towards Reliable Reputations for Distributed Applications*
    Date Graduated: Spring 2008
    First Position: Zynga
8. Amit Jardosh (co-advised with E. Belding)
    Dissertation Title: *Adaptive Large-Scale Wireles Networks: Measurements, Protocol Designs, and Simulation Studies*
    Date Graduated: Fall 2007
    First Position: Yahoo!
7. Khaled Harras
    Dissertation Title: *Protocol and Architectural Challenges in Delay and Disruption Tolerant Networks*
    Date Graduated: Summer 2007
    First Position: Assistant Professor, Carnegie Mellon University
6. Krishna Ramachandran (co-advised with E. Belding)
    Dissertation Title: *Design, Deployment, and Management of High-Capacity Wireless Mesh Networks*

Date Graduated: Winter 2006
First Position: Research Scientist, Citrix Online

5. Robert Chalmers
Dissertation Title: *Improving Device Mobility with Intelligence at the Network Edge*
Date Graduated: Summer 2004
First Position: President and CEO, Limbo.net

4. Prashant Rajvaidya
Dissertation Title: *Achieving Robust and Secure Deployment of Multicast*
Date Graduated: Spring 2004
First Position: President and CTO, Mosaic Networking

3. Sami Rollins
Dissertation Title: *Overcoming Resource Constraints to Enable Content Exchange Applications in Next-Generation Environments*
Date Graduated: Spring 2003
First Position: Assistant Professor, Mount Holyoke College

2. Srinivasan Jagannathan
Dissertation Title: *Multicast Tree-Based Congestion Control and Topology Management*
Date Graduated: Spring 2003
First Position: Consultant, Kelly & Associates

1. Kamil Sarac
Dissertation Title: *Supporting a Robust Multicast Service in the Global Infrastructure*
Date Graduated: Spring 2002
First Position: Assistant Professor, UT-Dallas

## D. M.S. Students Advised (Thesis/Project Option) [19 graduated]

19. Neer Shey
Research Area: *Analyzing Content Distribution Through Opportunistic Contact for Smart Cellular Phones*
Date Graduated: Spring 2010

18. Camilla Fiorese
Research Area: *Analysis of a Pure Rate-Based Congestion Control Algorithm*
Date Graduated: Summer 2009

17. Brian Weiner
Research Area: *Multi-Socket TCP: A Simple Approach to Improve Performance of Real-Time Applications over TCP*
Date Graduated: Fall 2007

16. Avijit Sen Mazumder
Research Area: *Facilitating Robust Multicast Group Management*
Date Graduated: Fall 2005

15. Rishi Matthew
Thesis Title: *Providing Seamless Access to Multimedia Content on Heterogeneous Platforms*
Date Graduated: Summer 2004

14. Camden Ho
Research Area: *Tools and Techniques for Wireless Network Management*
Date Graduated: Spring 2004

13. Amit Jardosh (co-advised with E. Belding)
Research Area: *Realistic Environment Models for Mobile Network Evaluation*
Date Graduated: Spring 2004

12. Nitin Solanki
    Research Area: *SongWand: A Wireless Barcode Scanner Using Bluetooth Technology*
    Date Graduated: Winter 2004
11. Vrishali Wagle (co-advised with E. Belding)
    Research Area: *An Ontology-Based Service Discovery Mechanism*
    Date Graduated: Winter 2004
10. Uday Mohan
    Thesis Title: *Scalable Service Discovery in Mobile Ad hoc Networks*
    Date Graduated: Spring 2003
9. Krishna Ramachandran
    Thesis Title: *Ubiquitous Multicast*
    Date Graduated: Spring 2003
8. John Slonaker
    Thesis Title: *Inductive Loop Signature Acquisition Techniques*
    Date Graduated: Spring 2002
7. Mohammad Battah
    Thesis Title: *Dedicated Short-Range Communications Intelligent Transportation Systems Protocol (DSRC-ITS)*
    Date Graduated: Spring 2002
6. Kevin Vogel
    Thesis Title: *Integrating E-Commerce Applications into Existing Business Infrastructures*
    Date Graduated: Spring 2001
5. Sami Rollins
    Thesis Title: *Audio XmL: Aural Interaction with XML Documents*
    Date Graduated: Winter 2000
4. Andy Davis
    Thesis Title: *Stream Scheduling for Data Servers in a Scalable Interactive TV System*
    Date Graduated: Spring 1999
3. David Makofske
    Thesis Title: *MHealth: A Real-Time Graphical Multicast Monitoring Tool*
    Date Graduated: Winter 1999
2. Prashant Rajvaidya
    Thesis Title: *MANTRA: Router-Based Monitoring and Analysis of Multicast Traffic*
    Date Graduated: Winter 1999
1. Alex DeCastro (co-advised with Yuan-Fang Wang)
    Thesis Title: *Web-Based Collaborative 3D Modeling*
    Date Graduated: Winter 1998

## E. Teaching Awards

2006-2007 UCSB Academic Senate Distinguished Teaching Award
2004-2005 Computer Science Outstanding Faculty Member
2000-2001 UCSB Spotlight on Excellence Award
1999-2000 Computer Science Outstanding Faculty Member (co-recipient)
1998-1999 Computer Science Outstanding Faculty Member (co-recipient)
1997-1998 Computer Science Outstanding Faculty Member

# II. Research

## A. Journal Papers, Magazine Articles, Books, and Book Chapters

62. L. Deek, E. Garcia-Villegas, E. Belding, S.J. Lee, and K. Almeroth, "A Practical Framework for 802.11 MIMO Rate Adaptation," Computer Networks, vol. 83, num. 6, pp. 332-348, June 2015.

61. L. Deek, E. Garcia-Villegas, E. Belding, S.J. Lee, and K. Almeroth, "Intelligent Channel Bonding in 802.11n WLANs," IEEE Transactions on Mobile Computing, vol. 13, num. 6, pp. 1242-1255, June 2014.

60. H. Zhang and K. Almeroth, "Alternatives for Monitoring and Limiting Network Access to Students in Network-Connected Classrooms," Journal of Interactive Learning Research (JILR), vol. 24, num. 3, pp. 237-265, July 2013.

59. M. Tavakolifard and K. Almeroth, "A Taxonomy to Express Open Challenges in Trust and Reputation Systems," Journal of Communications, vol. 7, num. 7, pp. 538-551, July 2012.

58. M. Tavakolifard and K. Almeroth, "Social Computing: An Intersection of Recommender Systems, Trust/Reputation Systems, and Social Networks," IEEE Network, vol. 26, num. 4, pp. 53-58, July/August 2012.

57. M. Tavakolifard, K. Almeroth, and P. Ozturk, "Subjectivity Handling of Ratings for Trust and Reputation Systems: An Abductive Reasoning Approach," International Journal of Digital Content Technology and its Applications (JDCTA), vol. 5, num. 11, pp. 359-377, November 2011.

56. R. Raghavendra, P. Acharya, E. Belding and K. Almeroth, "MeshMon: A Multi-Tiered Framework for Wireless Mesh Network Monitoring," Wireless Communications and Mobile Computing (WCMC) Journal, vol. 11, num. 8, pp. 1182-1196, August 2011.

55. A. Knight and K. Almeroth, "Automatic Plagiarism Detection with PAIRwise 2.0," Journal of Interactive Learning Research (JILR), vol. 22, num. 3, pp. 379-400, July 2011.

54. V. Kone, M. Zheleva, M. Wittie, B. Zhao, E. Belding, H. Zheng, and K. Almeroth, "AirLab: Consistency, Fidelity and Privacy in Wireless Measurements," ACM Computer Communications Review, vol. 41, num. 1, pp. 60-65, January 2011.

53. G. Swamynathan, K. Almeroth, and B. Zhao, "The Design of a Reliable Reputation System," Electronic Commerce Research Journal, vol. 10, num. 3-4, pp. 239-270, December 2010.

52. P. Acharya, A. Sharma, E. Belding, K. Almeroth and K. Papagiannaki, "Rate Adaptation in Congested Wireless Networks through Real-Time Measurements," IEEE Transactions on Mobile Computing, vol. 9, num. 11, pp. 1535-1550, November 2010.

51. R. Raghavendra, E. Belding, K. Papagiannaki, and K. Almeroth, "Unwanted Link Layer Traffic in Large IEEE 802.11 Wireless Networks," IEEE Transactions on Mobile Computing, vol. 9, num. 9, pp. 1212-1225, September 2010.

50. H. Zhang and K. Almeroth, "Moodog: Tracking Student Activity in Online Course Management Systems," Journal of Interactive Learning Research (JILR), vol. 21, num. 3, pp. 407-429, July 2010.

49. R. Chertov and K. Almeroth, "Qualitative Comparison of Link Shaping Techniques," International Journal of Communication Networks and Distributed Systems, vol. 5, num. 1/2, pp. 109-129, July 2010.

48. A. Knight and K. Almeroth, "Fast Caption Alignment for Automatic Indexing of Audio," International Journal of Multimedia Data Engineering and Management, vol. 1, num. 2, pp. 1-17, April-June 2010.

47. K. Harras and K. Almeroth, "Scheduling Messengers in Disconnected Clustered Mobile Networks," Ad Hoc & Sensor Wireless Networks, vol. 9, num. 3-4, pp. 275-304, March-April 2010.

46. A. Jardosh, K. Papagiannaki, E. Belding, K. Almeroth, G. Iannaccone, and B. Vinnakota, "Green WLANs: On-Demand WLAN Infrastructures," ACM Journal on Mobile Networks and Applications (MONET), vol. 14, num. 6, pp. 798-814, December 2009.

45. M. Wittie, K. Harras, K. Almeroth, and E. Belding, "On the Implications of Routing Metric Staleness in Delay Tolerant Networks," Computer Communications Special Issue on Delay and Disruption Tolerant Networking, vol. 32, num. 16, pp. 1699-1709, October 2009.

44. K. Harras, L. Deek, C. Holman, and K. Almeroth, "DBS-IC: An Adaptive Data Bundling System for Intermittent Connectivity," Computer Communications Special Issue on Delay and Disruption Tolerant Networking, vol. 32, num. 16, pp. 1687-1698, October 2009.

43. S. Karpinski, E. Belding, K. Almeroth, and J. Gilbert, "Linear Representations of Network Traffic," ACM Journal on Mobile Networks and Applications (MONET), vol. 14, num. 4, pp. 368-386, August 2009.

42. K. Harras and K. Almeroth, "Controlled Flooding in Disconnected Sparse Mobile Networks," Wireless Communications and Mobile Computing (WCMC) Journal, vol. 9, num. 1, pp. 21-33, January 2009.

41. R. Mayer, A. Stull, K. DeLeeuw, K. Almeroth, B. Bimber, D. Chun, M. Bulger, J. Campbell, A. Knight, and H. Zhang, "Clickers in College Classrooms: Fostering Learning with Questioning Methods in Large Lecture Classes," Contemporary Educational Psychology, vol. 34, num. 1, pp. 51-57, January 2009.

40. A. Knight, K. Almeroth, and B. Bimber, "Design, Implementation and Deployment of PAIRwise," Journal of Interactive Learning Research (JILR), vol. 19, num. 3, pp. 489-508, July 2008.

39. A. Garyfalos and K. Almeroth, "Coupons: A Multilevel Incentive Scheme for Information Dissemination in Mobile Networks," IEEE Transactions on Mobile Computing, vol. 7, num. 6, pp. 792-804, June 2008.

38. I. Sheriff, K. Ramachandran, E. Belding, and K. Almeroth, "A Multi-Radio 802.11 Mesh Network Architecture," ACM Journal on Mobile Networks and Applications (MONET), vol. 13, num. 1-2, pp. 132-146, April 2008.

37. M. Bulger, R. Mayer, K. Almeroth, and S. Blau, "Measuring Learner Engagement in Computer-Equipped College Classrooms," Journal of Educational Multimedia and Hypermedia, vol. 17, num. 2, pp. 129-143, April 2008.

36. G. Swamynathan, B. Zhao, and K. Almeroth, "Exploring the Feasibility of Proactive Reputations," Concurrency and Computation: Practice and Experience, vol. 20, num. 2, pp. 155-166, February 2008.

35. G. Swamynathan, B. Zhao, K. Almeroth, and H. Zheng, "Globally Decoupled Reputations for Large

Distributed Networks," Advances in Multimedia, vol. 2007, pp. 1-14, 2007.

34. R. Mayer, A. Stull, J. Campbell, K. Almeroth, B. Bimber, D. Chun and A. Knight, "Overestimation Bias in Self-reported SAT Scores," Educational Psychology Review, vol. 19, num. 4, pp. 443-454, December 2007.

33. P. Namburi, K. Sarac and K. Almeroth, "Practical Utilities for Monitoring Multicast Service Availability," Computer Communications Special Issue on Monitoring and Measurement of IP Networks, vol. 29, num. 10, pp. 1675-1686, June 2006.

32. R. Chalmers, G. Krishnamurthi and K. Almeroth, "Enabling Intelligent Handovers in Heterogeneous Wireless Networks," ACM Journal on Mobile Networks and Applications (MONET), vol. 11, num. 2, pp. 215-227, April 2006.

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## C. Workshop Papers (refereed)

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33. M. Tavakolifard, K. Almeroth, and J. Gulla, "Does Social Contact Matter? Modelling the Hidden Web of Trust Underlying Twitter," *ACM International Workshop on Social Recommender Systems (SRS)*, Rio de Janeiro, BRAZIL, May 2013.

32. D. Johnson, E. Belding, K. Almeroth and G. van Stam, "Internet Usage and Performance Analysis of a Rural Wireless Network in Macha, Zambia," *ACM Networked Systems for Developing Regions (NSDR) Workshop*, San Francisco, California, USA, June 2010.

31. D. Havey, R. Chertov, and K. Almeroth, "Wired Wireless Broadcast Emulation," *International*

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29. G. Swamynathan, C. Wilson, B. Boe, B. Zhao, and K. Almeroth, "Do Social Networks Improve e-Commerce: A Study on Social Marketplaces," *ACM Sigcomm Workshop on Online Social Networks (WOSN)*, Seattle, Washington, USA, August 2008.

28. R. Raghavendra, E. Belding, and K. Almeroth, "Antler: A Multi-Tiered Approach to Automated Wireless Network Management," *IEEE Workshop on Automated Network Management (ANM)*, Phoenix, Arizona, USA, April 2008.

27. S. Karpinski, E. Belding, and K. Almeroth, "Towards Realistic Models of Wireless Workload," *International Workshop on Wireless Network Measurement (WiNMee)*, Limassol, CYPRUS, April 2007.

26. K. Harras, M. Wittie, K. Almeroth, and E. Belding, "ParaNets: A Parallel Network Architecture for Challenged Networks," *IEEE Workshop on Mobile Computing Systems and Applications (HotMobile)*, Tucson, Arizona, USA, February 2007.

25. H. Caituiro-Monge, K. Almeroth, M. del Mar Alvarez-Rohena, "Friend Relay: A Resource Sharing Framework for Mobile Wireless Devices," *ACM International Workshop on Wireless Mobile Applications and Services on WLAN Hotspots (WMASH)*, Los Angeles, California, September 2006.

24. G. Swamynathan, Ben Y. Zhao and K. Almeroth, "Exploring the Feasibility of Proactive Reputations," *International Workshop on Peer-to-Peer Systems (IPTPS)*, Santa Barbara, California, USA, February 2006.

23. G. Swamynathan, Ben Y. Zhao and K. Almeroth, "Decoupling Service and Feedback Trust in a Peer-to-Peer Reputation System," *International Workshop on Applications and Economics of Peer-to-Peer Systems (AEPP)*, Nanjing, CHINA, November 2005.

22. K. Ramachandran, M. Buddhikot, G. Chandranmenon, S. Miller, E. Belding, and K. Almeroth, "On the Design and Implementation of Infrastructure Mesh Networks," *IEEE Workshop on Wireless Mesh Networks (WiMesh)*, Santa Clara, California, USA, September 2005.

21. A. Jardosh, K. Ramachandran, K. Almeroth and E. Belding, "Understanding Link-Layer Behavior in Highly Congested IEEE 802.11b Wireless Networks," Sigcomm Workshop on Experimental Approaches to Wireless Network Design and Analysis (EWIND), Philadelphia, Pennsylvania, USA, August 2005.

20. A. Sen Mazumder, K. Almeroth and K. Sarac, "Facilitating Robust Multicast Group Management," *Network and Operating System Support for Digital Audio and Video (NOSSDAV)* , Skamania, Washington, USA, June 2005.

19. Y. Sun, I. Sheriff, E. Belding and K. Almeroth, "An Experimental Study of Multimedia Traffic Performance in Mesh Networks," MobiSys International Workshop on Wireless Traffic Measurements and Modeling (WitMeMo), Seattle, Washington, USA, June 2005.

18. K. Ramachandran, K. Almeroth and E. Belding, "A Framework for the Management of Large-Scale Wireless Network Testbeds," International Workshop on Wireless Network Measurement (WiNMee),

Trentino, ITALY, April 2005.

17. A. Garyfalos, K. Almeroth and K. Sanzgiri, "Deployment Complexity Versus Performance Efficiency in Mobile Multicast," *International Workshop on Broadband Wireless Multimedia: Algorithms, Architectures and Applications (BroadWiM)*, San Jose, California, USA, October 2004.

16. C. Ho, K. Ramachandran, K. Almeroth and E. Belding, "A Scalable Framework for Wireless Network Monitoring," *ACM International Workshop on Wireless Mobile Applications and Services on WLAN Hotspots (WMASH)*, Philadelphia, Pennsylvania, USA, October 2004.

15. A. Garyfalos, K. Almeroth and J. Finney, "A Hybrid of Network and Application Layer Multicast for Mobile IPv6 Networks," *International Workshop on Large-Scale Group Communication (LSGC)*, Florence, ITALY, October 2003.

14. A. Garyfalos, K. Almeroth and J. Finney, "A Comparison of Network and Application Layer Multicast for Mobile IPv6 Networks," *ACM Workshop on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM)*, San Diego, California, USA, September 2003.

13. S. Jagannathan, and K. Almeroth, "Pricing and Resource Provisioning for Delivering E-Content On-Demand with Multiple Levels-of-Service," *International Workshop on Internet Charging and QoS Technologies (ICQT)*, Zurich, SWITZERLAND, October 2002.

12. S. Rollins, K. Almeroth, D. Milojicic, and K. Nagaraja, "Power-Aware Data Management for Small Devices," *Workshop on Wireless Mobile Multimedia (WoWMoM)*, Atlanta, GA, USA, September 2002.

11. K. Almeroth, S. Bhattacharyya, and C. Diot, "Challenges of Integrating ASM and SSM IP Multicast Protocol Architectures," *International Workshop on Digital Communications: Evolutionary Trends of the Internet (IWDC)*, Taormina, ITALY, September 2001.

10. K. Sarac and K. Almeroth, "Scalable Techniques for Discovering Multicast Tree Topology," *Network and Operating System Support for Digital Audio and Video (NOSSDAV)* , Port Jefferson, New York, USA, June 2001.

9. P. Rajvaidya, K. Almeroth and K. Claffy, "A Scalable Architecture for Monitoring and Visualizing Multicast Statistics," *IFIP/IEEE International Workshop on Distributed Systems: Operations & Management (DSOM)*, Austin, Texas, USA, December 2000.

8. S. Jagannathan, K. Almeroth and A. Acharya, "Topology Sensitive Congestion Control for Real-Time Multicast," *Network and Operating System Support for Digital Audio and Video (NOSSDAV)* , Chapel Hill, North Carolina, USA, June 2000.

7. K. Sarac and K. Almeroth, "Supporting the Need for Inter-Domain Multicast Reachability," *Network and Operating System Support for Digital Audio and Video (NOSSDAV)* , Chapel Hill , North Carolina, USA, June 2000.

6. D. Makofske and K. Almeroth, "MHealth: A Real-Time Multicast Tree Visualization and Monitoring Tool," *Network and Operating System Support for Digital Audio and Video (NOSSDAV)* , Basking Ridge New Jersey, USA, June 1999.

5. K. Almeroth and Y. Zhang, "Using Satellite Links as Delivery Paths in the Multicast Backbone (MBone)," *ACM/IEEE International Workshop on Satellite-Based Information Services (WOSBIS)*, Dallas, Texas, USA, October 1998.

4. M. Ammar, K. Almeroth, R. Clark and Z. Fei, "Multicast Delivery of Web Pages OR How to Make Web Servers Pushy," *Workshop on Internet Server Performance (WISP)*, Madison, Wisconsin, USA, June 1998.

3. K. Almeroth and M. Ammar, "Prototyping the Interactive Multimedia Jukebox," *Mini-conference on Multimedia Appliances, Interfaces, and Trials--International Conference on Communications (ICC)*, Montreal, Quebec, CANADA, June 1997.

2. K. Almeroth and M. Ammar, "Collection and Modeling of the Join/Leave Behavior of Multicast Group Members in the MBone," *High Performance Distributed Computing Focus Workshop (HPDC)*, Syracuse, New York, USA, August 1996.

1. K. Almeroth and M. Ammar, "The Role of Multicast Communication in the Provision of Scalable and Interactive Video-On-Demand Service," *Network and Operating System Support for Digital Audio and Video (NOSSDAV)* , Durham, New Hampshire, USA, April 1995.

## D. Non-Refereed Publications

8. K. Almeroth, E. Belding, M. Buddhikot, G. Chandranmenon, S. Miller, and K. Ramachandran, "Infrastructure Mesh Networks," *U.S. Patent Application US20070070959 A1*, September 2005.

7. K. Almeroth, R. Caceres, A. Clark, R. Cole, N. Duffield, T. Friedman, K. Hedayat, K. Sarac, M. Westerlund, "RTP Control Protocol Extended Reports (RTCP XR)," *Internet Engineering Task Force (IETF) Request for Comments (RFC) 3611*, November 2003.

6. Z. Albanna, K. Almeroth, D. Meyer, and M. Schipper, "IANA Guidelines for IPv4 Multicast Address Allocation," *Internet Engineering Task Force (IETF) Request for Comments (RFC) 3171*, August 2001.

5. B. Quinn and K. Almeroth, "IP Multicast Applications: Challenges and Solutions," *Internet Engineering Task Force (IETF), Request for Comments (RFC) 3170*, September 2001.

4. K. Almeroth, L. Wei and D. Farinacci, "Multicast Reachability Monitor (MRM) Protocol," *Internet Engineering Task Force Internet Draft*, July 2000.

3. K. Almeroth and L. Wei, "Justification for and use of the Multicast Reachability Monitor (MRM) Protocol," *Internet Engineering Task Force Internet Draft*, March 1999.

2. K. Almeroth, "Managing IP Multicast Traffic: A First Look at the Issues, Tools, and Challenges," IP Multicast Initiative White Paper, San Jose, California, USA, February 1999.

1. K. Almeroth, K. Obraczka and D. De Lucia, "Pseudo-IP: Providing a Thin Network Protocol for Semi-Intelligent Wireless Devices," *DARPA/NIST Smart Spaces Workshop*, Gaithersburg, Maryland, USA, July 1998.

## E. Released Software Systems

19. ***A Multi-radio Wireless Mesh Network Architecture -- http://moment.cs.ucsb.edu/tic/.*** Released December 1, 2006 (with K. Ramachandran, I. Sheriff, and E. Belding). The software as part of a multi-

radio wireless mesh network that includes a Split Wireless Router that alleviates the interference that can occur between commodity radios within a single piece of hardware. The second is server software to perform channel assignment and communicate the assignments throughout the mesh network.

18. ***AODV-Spanning Tree (AODV-ST) -- http://www.cs.ucsb.edu/~krishna/aodv-st/.*** Released September 1, 2006 (with K. Ramachandran and E. Belding). AODV-ST is an extension of the well-known AODV protocol specifically designed for wireless mesh networks. The advantages of AODV-ST over AODV include support for high throughput routing metrics, automatic route maintenance for common-case traffic, and low route discovery latency.

17. ***The Multicast Detective -- http://www.nmsl.cs.ucsb.edu/mcast_detective/.*** Released September 1, 2005 (with A. Sen Mazumder). The multicast detective is a robust solution to determine the existence and nature of multicast service for a particular user. By performing a series of tests, a user can determine whether there is network support for multicast, and consequently, whether a multicast group join is likely to succeed.

16. ***AutoCap: Automatic and Accurate Captioning -- http://www.nmsl.cs.ucsb.edu/autocap/.*** Released August 1, 2005 (with A. Knight). AutoCap is a software system that takes as input an audio/video file and a text transcript. AutoCap creates captions by aligning the utterances in the audio/video file to the transcript. For those words that are not recognized, AutoCap estimates when the words were spoken along with an error bound that gives the content creator an idea of caption accuracy. The result is a collection of accurately time-stamped captions that can be displayed with the video.

15. ***PAIRwise Plagiarism Detection System -- http://cits.ucsb.edu/pair/.*** Released July 1, 2005 (with A. Knight). PAIRwise is a plagiarism detection system with: (1) an easy-to-use interface for submitting papers, (2) a flexible comparison engine that allows intra-class, inter-class, and Internet-based comparisons, and (3) an intuitive graphical presentation of results.

14. ***DAMON Multi-Hop Wireless Network Monitoring -- http://moment.cs.ucsb.edu/damon/.*** Released October 1, 2004 (with K. Ramachandran and E. Belding). DAMON is a distributed system for monitoring multi-hop mobile networks. DAMON uses agents within the network to monitor network behavior and send collected measurements to data repositories. DAMON's generic architecture supports the monitoring of a wide range of protocol, device, or network parameters.

13. ***Multicast Firewall -- http://www.nmsl.cs.ucsb.edu/mafia/.*** Released June 1, 2004 (with K. Ramachandran). MAFIA, a multicast firewall and traffic management solution, has the specific aim of strengthening multicast security through multicast access control, multicast traffic filtering, and DoS attack prevention.

12. ***AODV@IETF Peer Routing Software-- http://moment.cs.ucsb.edu/aodv-ietf/.*** Released November 1, 2003 (with K. Ramachandran and E. Belding). One of the first large-scale efforts to run the Ad hoc On demand Distance Vector (AODV) routing protocol in a public space (at the Internet Engineering Task Force (IETF)). The implementation includes a daemon that runs on both the Linux and Windows operating systems.

11. ***Mobility Obstacles -- http://moment.cs.ucsb.edu/mobility/.*** Released September 1, 2003 (with A. Jardosh, E. Belding, and S. Suri). The topology and movement of nodes in ad hoc protocol simulation are key factors in protocol performance. In this project, we have developed ns-2 simulation plug-ins that create more realistic movement models through the incorporation of obstacles. These obstacles are utilized to restrict both node movement and wireless transmissions.

10. ***mwalk -- http://www.nmsl.cs.ucsb.edu/mwalk/.*** Released December 1, 2000 (with R. Chalmers).

Mwalk is a collection of Java applications and Perl scripts which re-create a global view of a multicast session from mtrace and RTCP logs. Users to the site can download mwalk, examine the results of our analysis, or download data sets for use in simulations dependent on multicast tree characteristics.

9. ***MANTRA2 -- http://www.nmsl.cs.ucsb.edu/mantra/.*** Released December 1, 1999 (with P. Rajvaidya). This new version of MANTRA focuses on the visualization of inter-domain routing statistics. Working in conjunction with the Cooperative Association for Internet Data Analysis (CAIDA) we have developed advanced collection and visualization techniques.

8. ***MRM -- http://www.nmsl.cs.ucsb.edu/mrm/.*** Released October 1, 1999 (with K. Sarac). MRM is the Multicast Reachability Protocol. We have implemented an end-host agent that responds to MRM Manager commands. Our end-host agent works in conjunction with Cisco routers to detect and isolate multicast faults.

7. ***MANTRA -- http://www.nmsl.cs.ucsb.edu/mantra/.*** Released January 1, 1999 (with P. Rajvaidya). MANTRA is the Monitoring and Analysis of Traffic in Multicast Routers. It uses scripts to collect and display data from backbone multicast routers.

6. ***SDR Monitor -- http://www.nmsl.cs.ucsb.edu/sdr-monitor/.*** Released January 1, 1999 (with K. Sarac). The SDR Monitor receives e-mail updates from participants containing information about observed sessions in the MBone. A global view of multicast reachability is then constructed.

5. ***The MHealth tool -- http://www.nmsl.cs.ucsb.edu/mhealth/.*** Released September 1, 1998 (with D. Makofske). The mhealth tool graphically visualizes MBone multicast group trees and provides `health' information including end-to-end losses per receiver and losses on a per hop basis. The implementation required expertise in Java, the MBone tools, and Unix.

4. ***The MControl tool -- http://www.nmsl.cs.ucsb.edu/mcontrol/.*** Released August 1, 1998 (with D. Makofske). Mcontrol is a tool to provide VCR-based interactivity for live MBone sessions. The implementation required expertise in Java, the MBone tools, and Unix.

3. ***Interactive Multimedia Jukebox (IMJ) -- http://imj.ucsb.edu/.*** Released October 1, 1996. The IMJ combines the WWW and the MBone conferencing tools to provide a multi-channel video jukebox offering both instructional and entertainment programming on a wide scale. The implementation required expertise in HTML, Perl, C, the MBone tools, and Unix.

2. ***Mlisten -- http://www.cc.gatech.edu/computing/Telecomm/mbone/.*** Released September 1, 1995. A tool to continuously collect MBone multicast group membership information including number and location of members, membership duration, and inter-arrival time for all audio and video sessions. The implementation required expertise in C, Tcl/Tk, the MBone tools, and UNIX socket programming.

1. ***Audio-on-Demand (AoD).*** March 1, 1995. A server/client prototype to demonstrate interactivity in near VoD systems. The AoD server provides songs-on-demand and VCR-like functions via multicast IP over Ethernet. The implementation required expertise in C, OpenWindows programming, UNIX socket programming, and network programming.

## F. Tutorials, Panels and Invited Talks

- "25th Anniversary Panel," Network and Operating System Support for Digital Audio and Video (NOSSDAV), Portland, Oregon, USA, March 2015.