

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

Case No.: IPR2024-00441

Patent No. 8,792,008
(Claims 1-18)

Before JON M. JURGOVAN, SCOTT B. HOWARD, AND AARON W. MOORE,
Administrative Patent Judges.

Petitioner's Demonstrative Exhibit

Grounds of Invalidity

PO Argues:

- Physical Substitution/Motivation
- Analog/Digital
- Concurrently Output
- Customer Premises Gateway
- Whether Renken is Prior Art
- Concurrently Output

Ground	References	Basis	Claims Challenged
A	Kamieniecki in view of Konstantinos	§ 103	1-18
B	Kamieniecki in view of Konstantinos and Yu	§ 103	7-8, 15-16
C	Kamieniecki in view of Konstantinos and Cholas	§ 103	9, 17
D	Renken	§ 103	1-6, 9-14, and 17-18
E	Renken in view of Cholas	§ 103	9, 17

(Pet., p. 25; ID, p. 7)

Overview of the '008 Patent

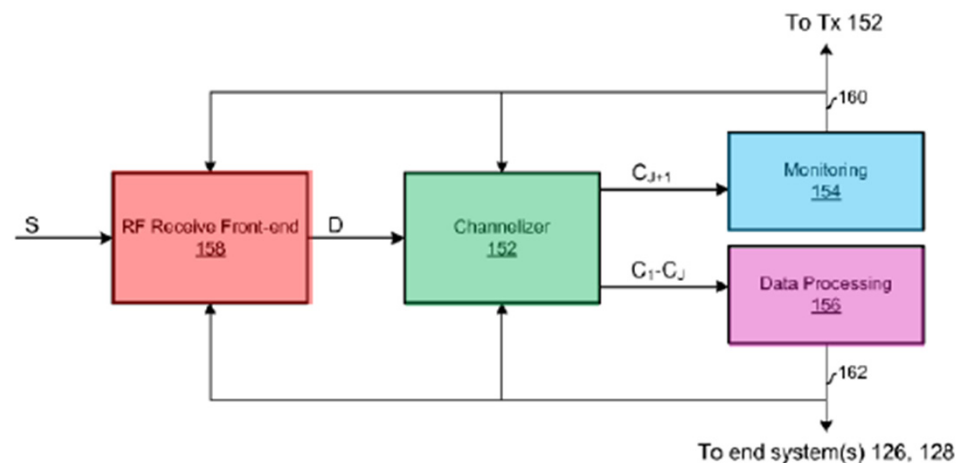
1. A system comprising:

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

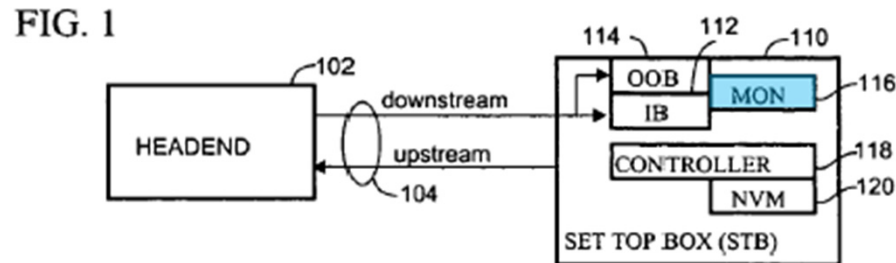
a channelizer operable to:
select a first portion of said digitized signal;
select a second portion of said digitized signal; and
concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.



Ex. 1001, Fig. 1B (annotated)

(Pet., p. 11; Ex. 1001 ('008 Patent), cl. 1, Fig. 1B)

Kamieniecki's Monitoring STB



Ex. 1009, Fig. 1 (annotated)

(Pet., pp. 13-15, 43; POR, pp. 15, 29; Ex. 1009 (Kamieniecki), ¶¶[0008], [0014]-[0017])

[0016] The invention therefore provides a method to allow a set-top box (STB) to collect statistics on plant health by monitoring the forward (downstream) and reverse (upstream, return path) transport cable signals, and reporting this information back to the cable headend.

(Pet., pp. 13-14; Ex. 1009 (Kamieniecki), ¶[0016])

gathered by the monitor (MON) 116. This signal quality information can include information about channel absence/presence, error count and signal level estimates. As described below, the information about signal quality can be transmitted by the STB to the headend either as it is collected, or when the STB is polled by the headend. The transmitter (e.g., modem) and other details of the STB, which are well known to those skilled in the art, are omitted for illustrative clarity.

(Pet., pp. 13-14; Ex. 1009 (Kamieniecki), ¶[0014])

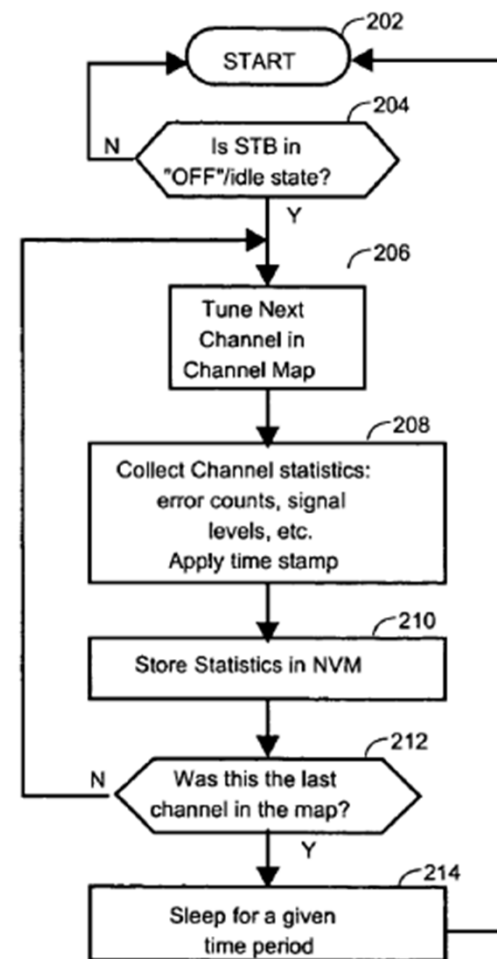
Kamieniecki Broadly Teaches Monitoring

headend 102. The set-top box 110 has more than one tuner (112, 114) so that it can receive out-of-band (OOB) communications simultaneously with in-band (IB) communications. This means that subscribers can be tuned to a channel receiving audio and video content while, at the same time, the STB 110 is receiving instructions in an OOB channel.

[0017] The monitoring feature can operate automatically in the background so as **not to disturb** any viewer experiences; i.e., when the STB is turned “off” and in an idle state. The STB will collect statistics on plant health, as indicated by signal quality, on a channel-by-channel basis. **It is within the scope of the invention that fewer than all of the channels are monitored.** (The channel map can indicate which chan-

[0027] For example, in systems where the network has not been upgraded to support a cable return path, a telephone modem may be included in the set-top box for sending signal quality reports from the STB to the headend. **Moreover, the STB could monitor only one channel, such as the OOB channel, without tuning through the channel map.**

FIG. 2



(Pet., pp. 9-10, 13-15, 36-40, 51; Ex. 1009 (Kamieniecki), ¶¶ [0013], [0017], [0027], Fig. 2; Ex. 1002 (Lett Declaration), ¶¶ 66-67)

Kamieniecki Broadly Teaches Monitoring

67. Kamieniecki describes its looping process as providing coverage and health check for all channels, but Kamieniecki also notes that if desired, fewer than all channels may be monitored, and that in some embodiments only a single channel may be monitored. Ex. 1009, [0013], [0015]-[0017], [0027], Fig. 2.

(Ex. 1002 (Lett Declaration), ¶67; Pet., pp. 13-15)

Konstantinos Provides Motivation to Improve Kamieniecki's STB

[0001] Current television receivers receive a single channel through a single tuner. The evolving market for data and programming services will demand that receivers have the capability of multi-channel tuning.

(Pet., pp. 15-16; Ex. 1010 (Konstantinos), ¶[0001])

[0011] In August of 2006, Cable Labs, Inc. issued “Data Over Cable Service Interface Specification (DOCSIS) 3.0.” DOCSIS 3.0 data reception and channel binding, both of which require the simultaneous reception of at least 4 channels placed not further than 60 MHz apart from each other. The block tuner described above enables DOCSIS 3.0, but does not enable unrestricted multi-channel functionality. For example, the simultaneously received number of channels is small and there is no freedom from a user’s perspective to select (or combine together for faster data reception) many/any channels freely out of the full cable TV band. The latter usually consist of up to 100 channels between 50-1000 MHz.

(Pet., pp. 32-35; Ex. 1010 (Konstantinos), ¶[0011])

Konstantinos Provides Motivation to Improve Kamieniecki's STB

[0006] Existing receiver architectures based on the concept shown in FIG. 1 are not able to satisfy properly the need for multi-channel reception. The conventional approach would be to use many single channel tuners in parallel connected to the same input signal source to make a multi-channel tuner. This approach, however, faces major limitations related to complexity of system implementation, signal quality, and cost effectiveness. As the number of simultaneously required streams/channels goes beyond two, the conventional approach becomes completely impractical.

(Pet., pp. 32-35; Ex. 1010, ¶[0006])

[0016] What is needed, therefore, is a single IC receiver able to provide unrestricted multi-channel functionality.

(Pet., pp. 32-35; Ex. 1010, ¶[0016])

Konstantinos – Multi-channel Receiver

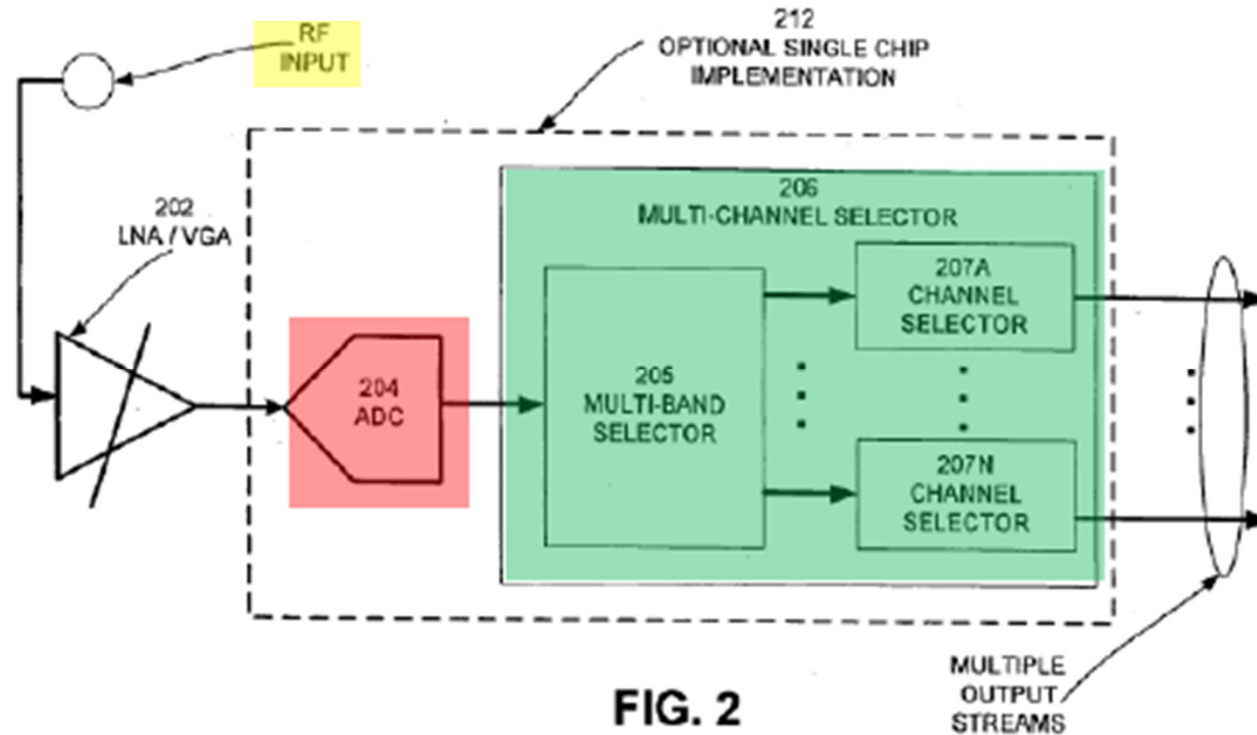


FIG. 2

izer. A composite broadband RF input signal (e.g. a cable TV signal consisting of multiple channels bundled together between 50-1000 MHz) is received at LNA/VGA 202 from a signal source. Here, the signal is pre-conditioned (amplified, filtered, potentially also equalized). The output of LNA/VGA 202 subsequently it is digitized in its entirety with an ADC 204. No frequency translation and no selectivity take place at this stage.

(Ex. 1010 (Konstantinos), ¶ [0043]; Pet., p. 16)

[0106] The next step, after the reception and channel selection of multiple channels, is the channel decoding process. This is accomplished with a multi-channel baseband processor (not illustrated). For example, a multi-channel channel decoder 208 processes 16 TV streams simultaneously and delivers 16 transport streams for video. These can be further processed with channel and source decoders.

(Pet., pp. 15-17, 36-38; Ex. 1010 (Konstantinos), Fig. 2 ¶¶ [0043], [0106]; Ex. 1002 (Lett Declaration), ¶¶75-76)

Kamieniecki + Konstantinos Shows 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.

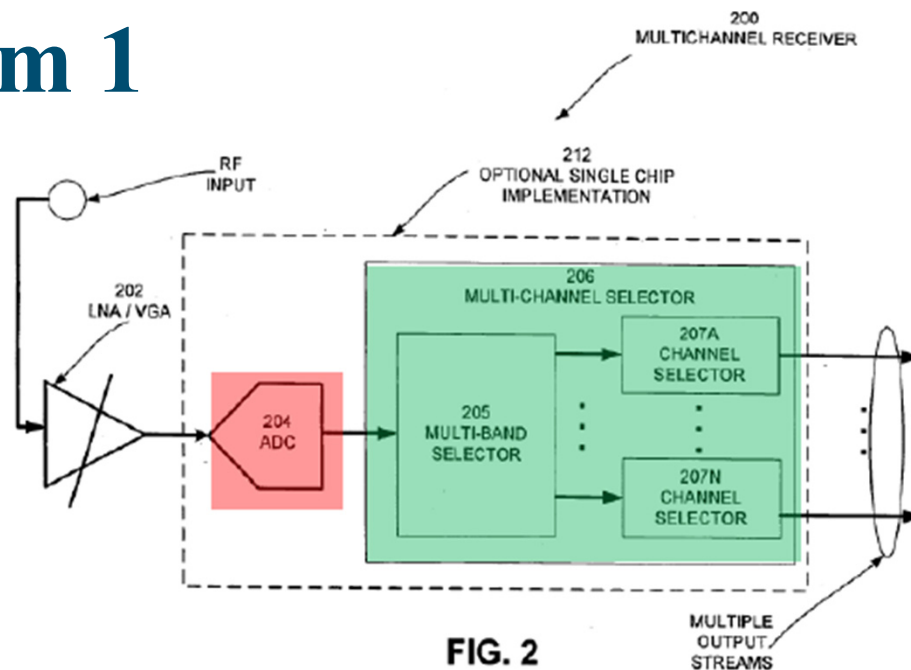
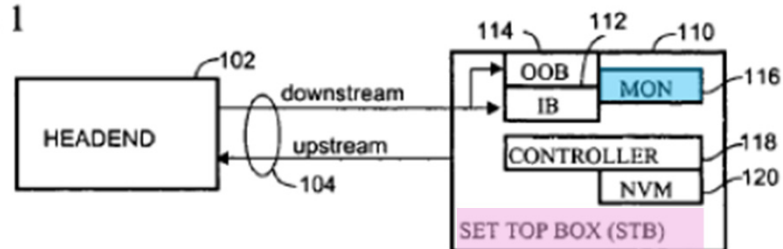


FIG. 2

FIG. 1



Ex. 1009, Fig. 1 (annotated)

(Pet., pp. 32-44; Ex. 1009 (Kamieniecki), Fig. 1; Ex. 1010 (Konstantinos), Fig. 2)

Konstantinos Helps Kamieniecki's STB Perform Better

- Unlimited Multi-Channel Functionality Means STB Can Receive Many Channels at Once
(Pet., pp. 33-34; Ex. 1002 (Lett Declaration), ¶¶72, 76, 80, 115, 125, 145)
- Better Monitoring
 - No Longer Limited to Only Monitoring IB Channels During Idle Periods
 - Errors Could Occur at Any Time of Day (Pet., p. 43; Ex. 1002 (Lett Declaration), ¶145; Reply, pp. 6-7)
- Better STB Performance
 - Simultaneously Receiving Multiple Channels Leads to Faster Channel Switching
(Pet., p. 34, Ex. 1002 (Lett Declaration), ¶125)

Petition Not Limited to a Physical Substitution

Combining Konstantinos with Kamieniecki also would be merely using known **techniques** (a single chip multi-channel digital receiver) to improve similar devices (Kamieniecki's STB having multiple TV tuners) to yield a predictable result (converting a received RF signal into multiple digital outputs). Ex. 1002, ¶ 127. A POSITA would have had the skill to implement Konstantinos' **teachings** in the system of Kamieniecki because Kamieniecki's IB and OOB tuners use the same inputs (an RF signal) and same outputs (digital signal of the desired channel) as those of Konstantinos' multi-channel receiver chip and the POSITA would be familiar with the design of RF receivers.

(Pet, pp. 34-35)

PO Demanded Mr. Lett Place the Decoder (“Data Processor”) *Relative to the Monitor*

21 Q. In putting together your proposed
22 combination set-top box, if a person of skill
1 in the art did not use the Konstantinos
2 multi-channel decoder, where would those
3 decoders sit in the box?

4 MR. QUALEY: Objection to form.

5 BY MR. GALLUZZO:

6 Q. I guess I could specify.

7 Where would they sit in relation to
8 the monitor and the multiple -- I'm sorry, the
9 multi-channel receiver?

(POR, pp. 23-24; Ex. 2014 (Lett Deposition),
159:21-160:9)

PO Demanded Mr. Lett Place the Decoder (“Data Processor”) *Relative to the Monitor*

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;

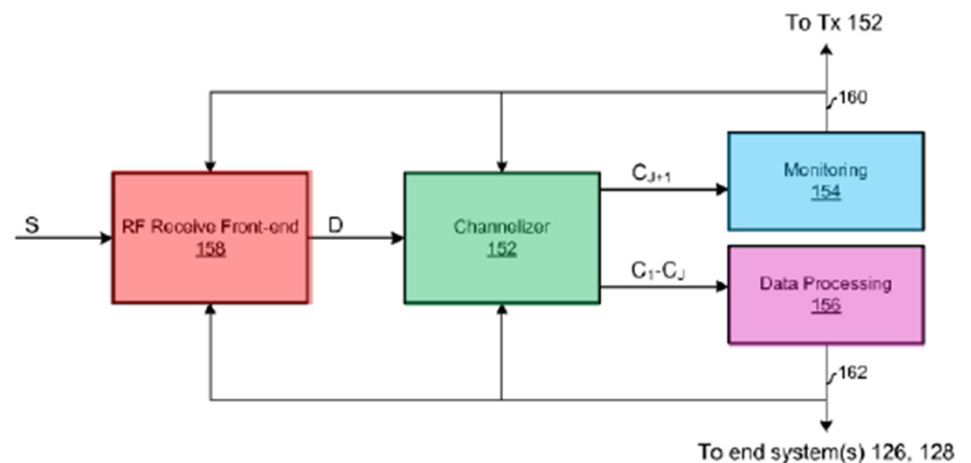
a signal monitor operable to:

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.



Ex. 1001, Fig. 1B (annotated)

(POR, pp. 23-24; Ex. 1001 ('008 Patent), cl. 1, Fig. 1B; Pet., p. 11)

Mr. Lett Explained Several Possibilities

21 Q. So what I am trying to imagine is,
22 in the processing stack, or if you want to call

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1 it the processing steps of an incoming signal,
2 where do the decoders sit, now that you have
3 replaced in-band and out-of-band tuners with
4 the multi-channel receiver of Konstantinos?

5 A. So it would be after the
6 multi-channel receiver so that you could decode
7 and display the channel selected with the
8 channel selector 207 A through N.

(Reply, pp. 4-5; Ex. 2014 (Lett Dep.), 161:1-8)

15 In general, the -- one of the
16 outputs, it's one or more of the outputs,
7 right, go to one or more decoders for the
8 purpose of displaying video. In that
9 functionality, if it's for the purpose of
0 displaying video, you don't have to have an
1 MPEG decoder.

2 So it's possible that one could also

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1 have an MPEG decoder in that path if you wanted
2 to measure something that had to do with the
3 video channel after decoding. But if we are
4 talking about monitoring something, like signal
5 noise ratio, or I mean, even error rate for the
6 visual stream, you don't have to have a MPEG
7 decoder.

8 So I would probably draw this a
9 little differently than what you drew.

(Reply, pp. 4-5; Ex. 2014 (Lett Dep.), 166:15-167:9)

PO Incorrectly Argues Power and Interference Issues are too Difficult

- But These Are Addressed in Konstantinos's "Interleaved" ADC:

[0061] The partitioned architecture of ADC 204 results in relaxed bandwidth limitations of the associated front-end circuitry compared to standard Time Interleaved ADC and reduces substantially the complexity of corrections associated with timing errors (dominant limitation at high speeds). It also improves significantly on power consumption efficiency because the architecture of ADC 204 allows the use of ADC units to be interleaved that are not pushed at extremes of speed and power consumption as in the standard design. This comes without penalties on speed and timing error correction complexity that typically associate with the use of many ADC units in parallel.

[0104] First, the original high rate signal is translated into a set of sub-signals (equivalently, the sub-bands A . . . H in FIG. 3) that contain all of the TV channels of the original signal in a parallel format. Therefore no information loss takes place: for example, one signal at a rate of 2 GS/sec containing 100 6 MHz-wide TV channels between 50-1000 MHz is translated into 8 signals each containing a portion of 125 MHz of the original and running at 250 MS/sec. This translation reduces the signal rates substantially, with overall benefits in power consumption, reduced interference, etc.

(Reply, pp. 2-3; Ex. 1010 (Konstantinos), ¶¶[0061], [0104])

- '008 Patent Also Uses an Interleaved ADC:

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.

(Reply, p. 3; Ex. 1001 ('008 Patent), 5:53-57)

PO Incorrectly Argues “Fundamental Difference” in RF Channels Prevents Combination

(POR, pp. 25-26; Sur-reply, pp. 15-16)

- PO Incorrectly Assumes:
 - Kamieniecki is Limited to 6 MHz IB and 1-2 MHz OOB Channels
 - Konstantinos is Limited to DOCSIS 6 MHz Channels
- Neither Reference Limits its Tuner/Receiver to These Ranges, or the Standards that Use Them
 - PO Relies on its Expert, who Argues that Kamieniecki Uses “QPSK” Modulation While Konstantinos Uses “QAM”

(Reply, pp. 5-6; Ex. 1032 (Lett Reply Declaration), ¶10)
 - But Petitioner’s Expert Disagrees, Explaining that a POSITA Would Know that QPSK is Just One Type of QAM
 - Even if this Difference Existed in the References, a POSITA Would Not Have Been Deterred By This Alleged Difference

(Sur-reply, p. 16; Ex. 2013 (Russ Declaration), ¶¶ 59-61)

(Reply, pp. 5-6; Ex. 1032 (Lett Reply Declaration), ¶10)

PO's Expert Admits that by 2002, the "Basic" Explorer 4200 STB Already Included DOCSIS Tuner

PO's Expert:

7 Q. Now, one of the boxes you worked on
8 was the Explorer 4200 set-top box; is that
9 correct?

10 A. That is correct.

11 Q. And that was released in 2002?

12 A. That's my recollection, yes.

(Reply, pp. 12-13; Ex. 1033 (Russ Deposition), 51:7-11)

6 Q. And did the 4200 use the DOCSIS
7 tuner to receive out-of-band signals?

8 A. I think the way I would put it is
9 that it could. I don't know how the
10 Cablevision system actually worked. The DOCSIS
11 was available. But, also, I know you could use
12 the DOCSIS forward path for -- you could
13 theoretically use the DOCSIS forward path for
14 in-band functions as well, like program guide
15 data. So I don't know how the Cablevision
16 system worked.

17 Q. So am I right in thinking it would
18 be capable of receiving the out-of-band on the
19 DOCSIS tuner, but you don't know if it actually
20 worked that way in production. Is that
21 accurate?

22 A. That is accurate.

(Reply, pp. 12-13; Ex. 1033 (Russ Deposition), 54:17-:22)

PO Incorrectly Argues Combination Loses Kamieniecki's OOB Tuner and its Functionality

(POR, pp. 34-36)

- This Misstates the Combination – OOB Functionality Remains

PO argues that the combination would render Kamieniecki “inoperable,” based on an incorrect assumption that the modification would lose all functionality of the OOB channel due to “removal of the OOB tuner.” POR 34-36. The combination does not lose OOB functionality – it simply uses the Konstantinos receiver to receive the OOB data previously received by Kamieniecki’s OOB tuner. (Reply, p. 11)

Pet. 34-36.

In the Kamieniecki-Konstantinos combination, the IB and OOB channels of Kamieniecki would be the RF Input that is received by the Konstantinos multi-channel receiver 200. The digitization of the IB and OOB channels of Kamieniecki (Pet., p. 38)

- PO’s Sur-Reply Statement that this was Unrebutted is Incorrect
 - This is Explained by Mr. Lett in His Declaration (Ex. 1002, ¶116), His Reply Declaration (Ex. 1032, ¶10), the Petition pp. 33-34, and the Reply pp. 5-6, 11.

(Sur-reply, p. 15; Reply, pp. 5-6, 11; Pet., pp. 33-34 Ex. 1002 (Lett Declaration) ¶ 116; Ex. 1032 (Lett Reply Declaration), ¶10)

PO Argues Incorrectly That Kamieniecki Received Analog and Digital, But Only Monitored Analog

- PO Incorrectly Argues Kamieniecki's STB Lacked ADC:

As an initial matter, Kamieniecki does not disclose an analog-to-digital converter (ADC) or anything like it.

(POR, p. 38)

- But Kamieniecki Receives MPEG-2 and Digital Video:

[0004] A basic set-top box (STB) includes a single, in-band (IB), tuner. The in-band tuner receives, e.g., MPEG-2 transport streams. These can include tables based upon standards such as the digital video broadcast (DVB) standard or the Advanced Television Systems Committee (ATSC) standard. Such a basic set-top box can receive analog or digital transmissions, on in-band (IB) channels,

(Reply, p. 12; Ex. 1009 (Kamieniecki), ¶[0004])

(Reply, p. 13; Ex. 1033 (Russ Deposition), 32:6-17;
Ex. 2013 (Russ Declaration), ¶62)

- PO's Expert:

6 Q. Now, for a set-top box to receive
7 an MPEG-2 transport stream and output it for
8 viewing, the set-top box has to include an
9 analog-to-digital converter; is that correct?
10 MR. FULLER: Objection to
11 form.
12 A. I mean, I think it's fair to say
13 that there is analog-to-digital conversion in
14 there somewhere. Let me think about that.
15 There would have to be
16 analog-to-digital conversion in there
17 somewhere.

B. Typical Components in a Cable Set-Top Box

1. Analog to Digital Converter

Kamieniecki Broadly Teaches Monitoring

[0018] The monitoring feature can be activated any time the STB is in an idle state and not being used. In order to provide plant health monitoring, the STB can provide three main monitoring functions.

[0019] monitoring of errors/dropouts on the OOB control channel;

[0020] monitoring of errors/dropouts on the forward/downstream transport channel (mainly consisting of video services);

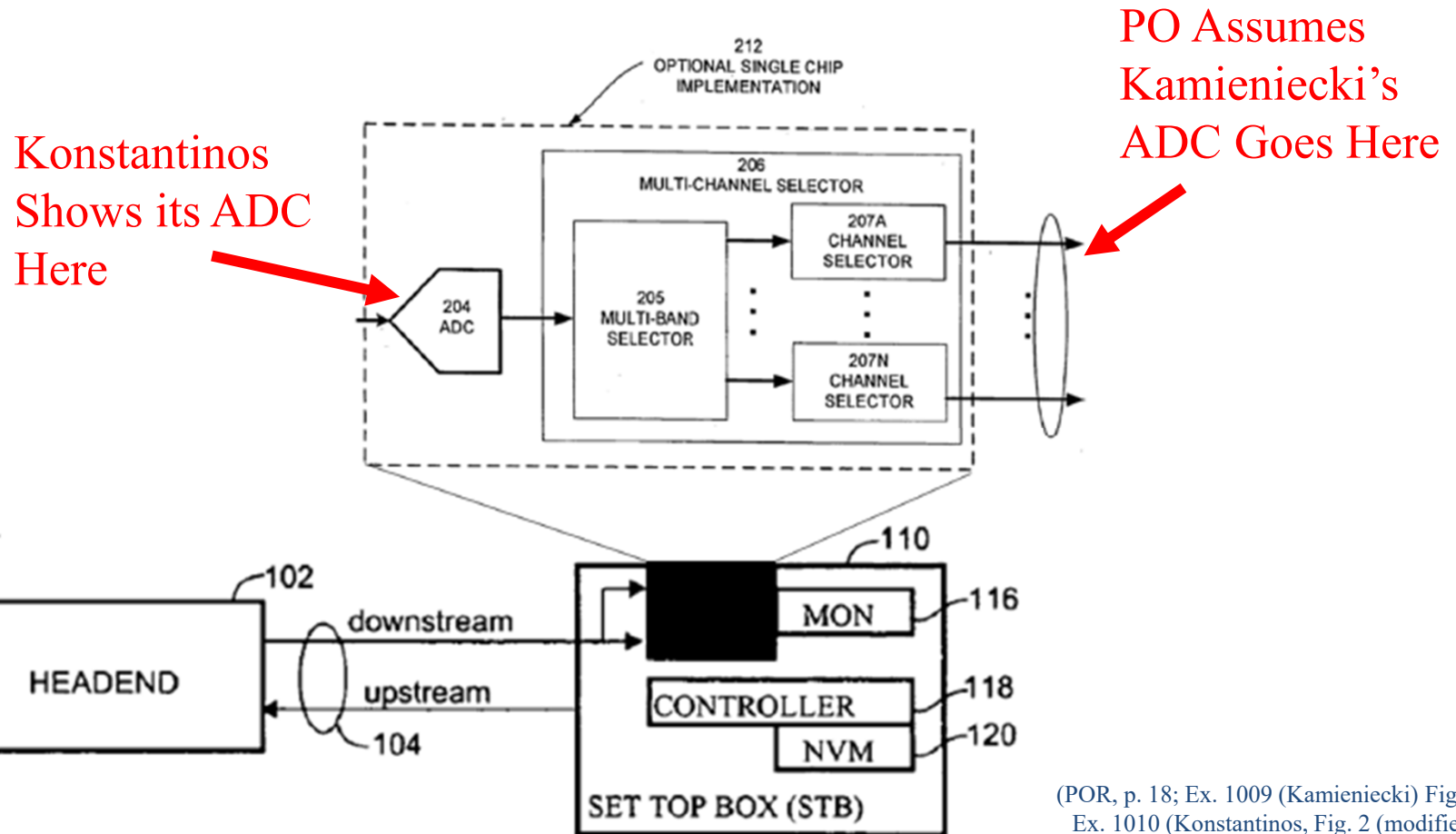
[0021] verification of return path health by transmission of ack/nack or “ping” messages from the STB to the headend and back

(Pet., pp. 14-15; Ex. 1009 (Kamieniecki), ¶¶[0018]-[0021])

PO Incorrectly Argues: Too Many ADCs

- PO Incorrectly Argues: Kamieniecki's ADC Would Mean 2 ADCs in the Bodily Incorporation:

(Sur-reply, pp. 17-18)



(POR, p. 18; Ex. 1009 (Kamieniecki) Fig. 1;
Ex. 1010 (Konstantinos, Fig. 2 (modified))

PO Incorrectly Argues Kamieniecki's "Basic" STB is Good Enough, and Konstantinos is for "Advanced" STBs

(Sur-Reply, pp. 9-12)

- PO Ignores Konstantinos' Express Teaching of the Evolving Market Demand:

[0001] Current television receivers receive a single channel through a single tuner. The evolving market for data and programming services will demand that receivers have the capability of multi-channel tuning.

[0016] What is needed, therefore, is a single IC receiver able to provide unrestricted multi-channel functionality. (Pet., pp. 15-16, 32-35; Ex. 1010 (Konstantinos), ¶¶[0001], [0016])

- Even if SOME Users Preferred the "Basic" STB, Others Would be Part of the Evolving Market

(Reply, p. 8; Ex. 1032 (Lett Reply Declaration), ¶¶5-6)

PO Incorrectly Argues Kamieniecki's “Principle of Operation” was to Limit Monitoring to Idle Times

(POR, pp. 30-32; Sur-Reply, pp. 13-14)

- Mr. Lett:

It is also desirable to perform the monitoring at any time, without having to wait for the STB 110 to be idle, because network errors can occur at any time of the day – not just during the STB 110's idle periods – and a POSITA would have wanted to be able to make measurements at any desired time, even if the STB 110 happened to be in use. Kamieniecki described waiting until the STB 110 was idle before performing its monitoring, but this was only needed because Kamieniecki's STB 110 had only one IB tuner 112 and only one OOB tuner 114, and because Kamieniecki wished to avoid disturbing users. Ex. 1009, [0014]-[0017], Fig. 2.

(Pet., p. 43; Ex. 1002 (Lett Declaration),
¶145; Reply, pp. 6-7)

Concurrent Monitoring and Processing

- [1E] “... 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.”

(Sur-Reply, pp. 13-14; Ex. 1001 ('008 Patent), cl. 1)

- PO Incorrectly Argues This Would Alter a “1:1 Ratio” of Konstantinos’s Channel Selectors and Decoders
 - Konstantinos Does not Require a Decoder for Every Selector
 - Konstantinos Says Channels “May” be Decoded

(Sur-Reply, p. 15)

207N. Depending on the number of channel selectors that are implemented in multi-channel selector **206** will determine the number of output streams that will be available. In an embodiment, each output stream represents a channel that **may** be further processed by a decoder (not illustrated). In an embodi-

(Reply, pp. 10-11; Ex. 1032 (Lett Reply Declaration), ¶7; Ex. 1010 (Konstantinos), ¶[0043])

PO Argues that Kamieniecki Already Had Multi-Channel Reception (IB/OOB), Allowing Simultaneously Monitoring OOB and Tuning to an IB Channel

(POR, p. 32)

- Kamieniecki's Single-Channel IB Tuner Can Only Tune One IB Channel at a Time

(Reply, p. 10; Ex. 2013 (Russ Declaration), ¶84)

PO's Expert:

84. Based on Kamieniecki disclosing only a single IB tuner and single OOB tuner, Kamieniecki's set-top box could select and monitor only a single IB channel and a single OOB tuner at a time. Mr. Lett confirmed this understanding of Kamieniecki in his declaration and at his deposition. Ex. 1002, ¶¶ 68, 145; Ex. 2014, 123:13-124:8.

- The Konstantinos Multi-Channel Receiver Allows Monitoring IB Channel While Watching TV

(Pet., pp. 13-17; Reply, p. 10; Ex. 2013 (Russ Declaration), ¶57)

Independent Claims 1 and 3 Overlap, PO Does Not Argue Claim 3 Separately

(POR, p. 11)

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.

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.

Ground C: Claims 9 and 17

- [9]/[17] “... wherein said one or more circuits reside in a customer premises gateway”

(Sur-Reply, pp. 15-16)

- This is Shown in Several Ways.
 - Kamieniecki’s STB Includes a Modem

collected, or when the STB is polled by the headend. The transmitter (e.g., modem) and other details of the STB, which are well known to those skilled in the art, are omitted for illustrative clarity.

(Pet., pp. 52-53; Reply, pp. 15-16; Ex. 1009 (Kamieniecki), ¶¶[0002], [0014]; Ex. 1002 (Lett Declaration), ¶175))

[0002] Modem cable television networks include a return path and out-of-band (OOB) communications channels which enable a bi-directional flow of information between a subscriber’s set-top box (STB) and the cable operator’s headend. The operator maintains a distribution plant, and the cable network comprises many paths and nodes, ultimately ending at the subscriber level. Digital cable systems can make use of the cable return path and a cable modem in the set-top box to manage all downstream and upstream traffic to the set-top box. For example, the set-top box can contact

Ground C: Claims 9 and 17

- [9]/[17] “... wherein said one or more circuits reside in a customer premises gateway”

(Sur-Reply, pp. 15-16; Ex. 1001 ('008 Patent), cl. 9, 17)

- The '008 Patent Uses “Gateway” and “STB” Interchangeably

above. In an example embodiment, the front-end **158A** may reside in satellite gateway/set-top box and/or in an outdoor

(Pet., p. 52; Ex. 1001 ('008 Patent), 5:36-37; Reply, p. 15; Ex. 1002 (Lett Declaration), ¶175)

- Claimed “Customer Premises Gateway” is Broad Enough to Encompass a STB
- PO Does Not Dispute This

(POR, pp. 45-47)

Ground C: Claims 9 and 17

- [9]/[17] “... wherein said one or more circuits reside in a customer premises gateway”
(Sur-Reply, pp. 15-16; Ex. 1001 ('008 Patent), cl. 9, 17)
- Cholas (Ex. 1017) Uses the Term “Premises Services Gateway” to Refer to Device Combining Functionality of STB and Cable Modem

[0139] FIG. 2*b* is a block diagram illustrating an exemplary embodiment of a premises network topology according to the invention which utilizes such an integrated device, herein referred to generally as a **premises services gateway (PSG) 200**, which can take many different forms as described subsequently herein. As stated above, **the PSG 200** can if so configured, **be used to replace the separate cable modem 212 and the set-top box 208 of FIG. 2*a*, providing the functionality of both units.** Specifically, one exemplary embodiment of

(Pet., pp. 52-53; Ex. 1017 (Cholas), ¶[0139];
Ex. 1002 (Lett Declaration) ¶175)

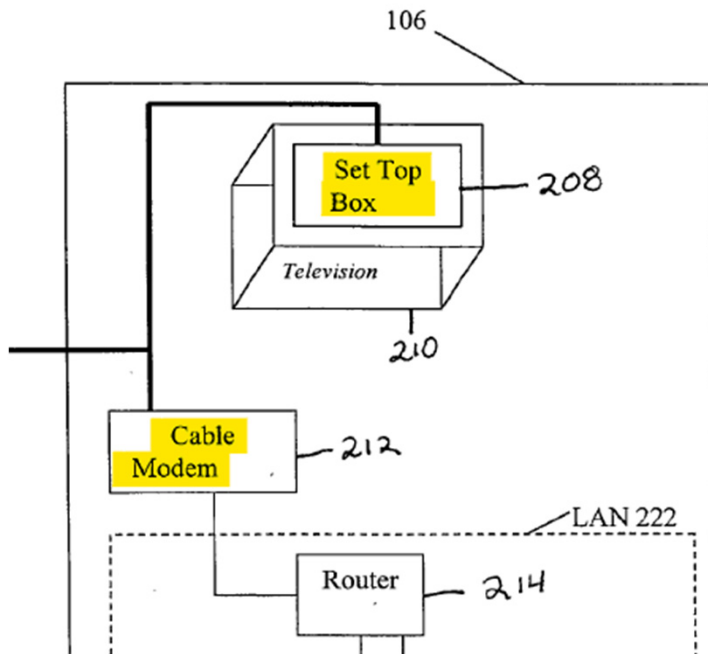
Ground C: Claims 9 and 17

- [9]/[17] “... wherein said one or more circuits reside in a customer premises gateway”

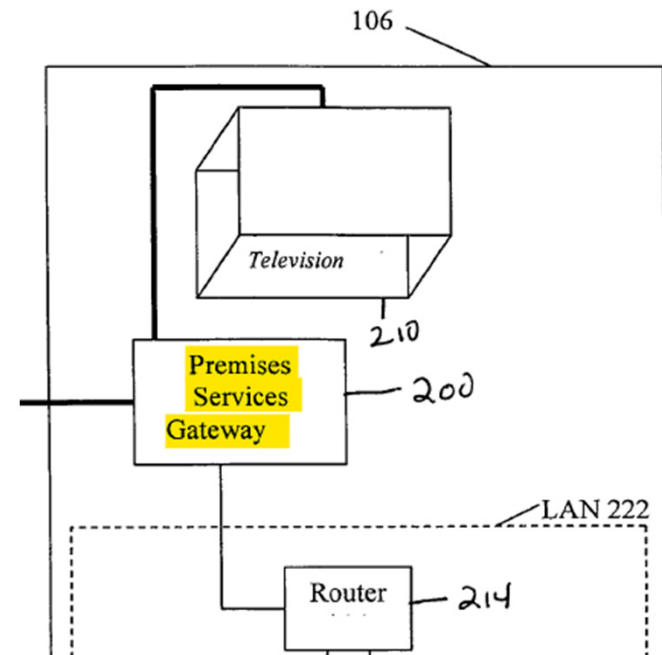
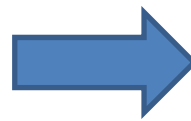
(Sur-Reply, pp. 15-16; Ex. 1001 ('008 Patent), cl. 9, 17)

- Cholas Premises Services Gateway (200) Integrates Functionality of STB (208) and Cable Modem (212)

(Pet., pp. 52-53; Ex. 1017 (Cholas), Figs. 2a, 2b)



(Pet., pp. 52-53; Ex. 1017 (Cholas), Fig. 2a)



(Pet., pp. 52-53; Ex. 1017 (Cholas), Fig. 2b)

Grounds D and E

D	Renken	§ 103	1-6, 9-14, and 17-18
E	Renken in view of Cholas	§ 103	9, 17

PO Argues:

- Whether Renken is Prior Art
- “Concurrently Output” limitation not shown as to signal monitor

(Pet., p. 25; POR, pp. 44-49)

Renken

- “Cable Modem for Network Measurements”

(57)

ABSTRACT

The invention relates to measurement-capable cable modems for cable networks. Idle receivers and transmitters of a cable modem are used to perform upstream and downstream measurements on DOCSIS and non-DOCSIS digital and analog TV channels without disrupting customer services. A currently idle receiver is tuned to a target downstream channel under directions of a modem measurement controller, and is queried by the measurement controller to perform a measurement as specified by a measurement plan. A currently idle transmitter is tuned to a target upstream channel to transmit a test signal that is received by an upstream measurement system. Measurements are communicated to a central measurement controller, for example located at the headend, which collects measurements from a plurality of cable modems and the upstream measurement system. The resulting monitoring system performs cable network wide monitoring using existing cable modems without requiring additional monitoring devices.

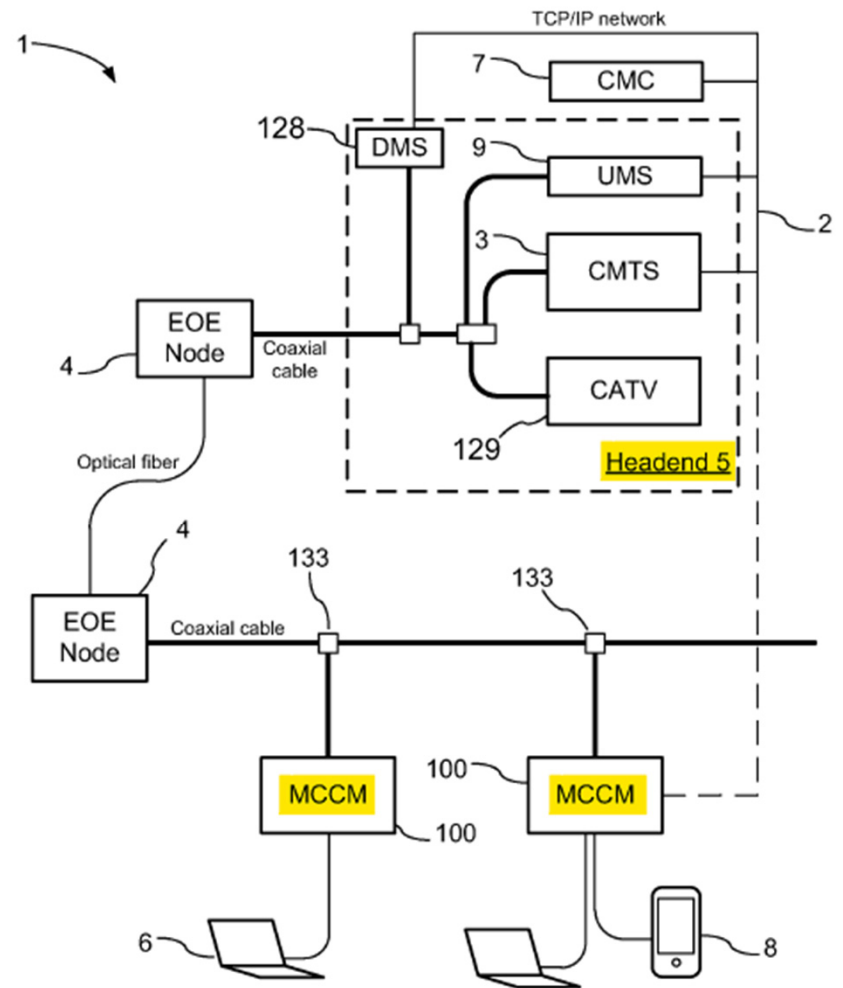


Fig. 1

(Pet., p. 17; Ex. 1011 (Renken),
Cover, Abstract)

Renken

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.

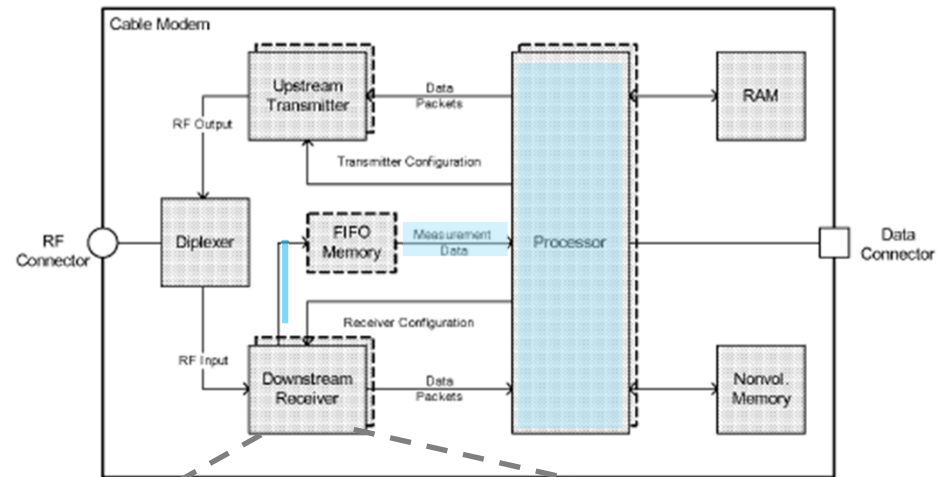


Fig. 1

Cable Modem Block Diagram Description

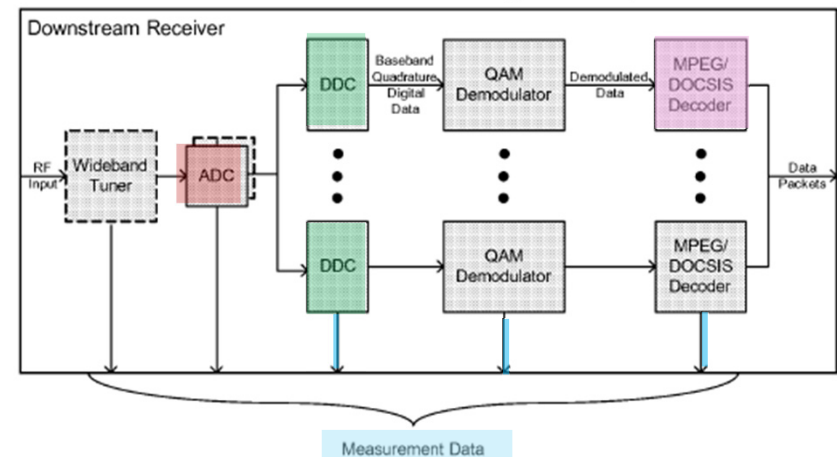


Fig. 2

(Pet., pp. 60-67; Ex. 1012 (Renken Provisional) pp. 5-6; Ex. 1002 (Lett Declaration), ¶¶191-217)

“Concurrently Output”

[1E] “... 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”

(POR, pp. 53-62; Ex. 1001
(‘008 Patent), cl. 1)

- DDCs Concurrently Output Their Respective Channels:

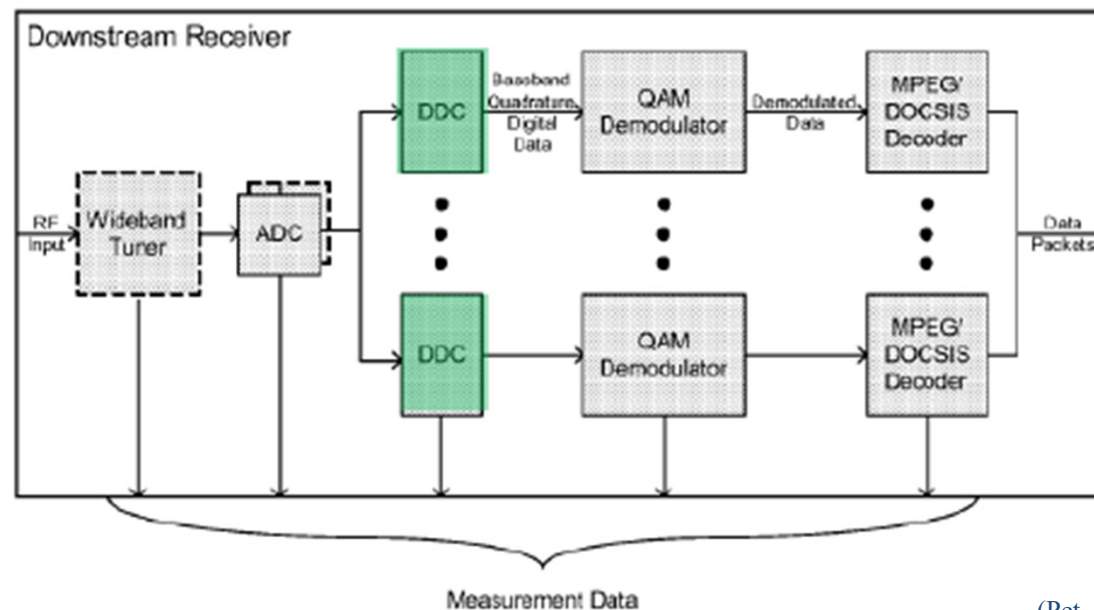


Fig. 2

(Pet., pp. 66-67; Ex. 1011 (Renken), Fig. 3;
Ex. 1012 (Renken Provisional), pp. 6-7)

“Concurrently Output”

- PO Incorrectly Argues the Petition Limited the Signal Monitor to ONLY the MCCM Processor
- And that the Selected Portions from the DDCs do not Reach that Processor (POR., pp. 53-62)
- But the Measurement Data (Blue) Clearly Goes to Processor (also Blue)

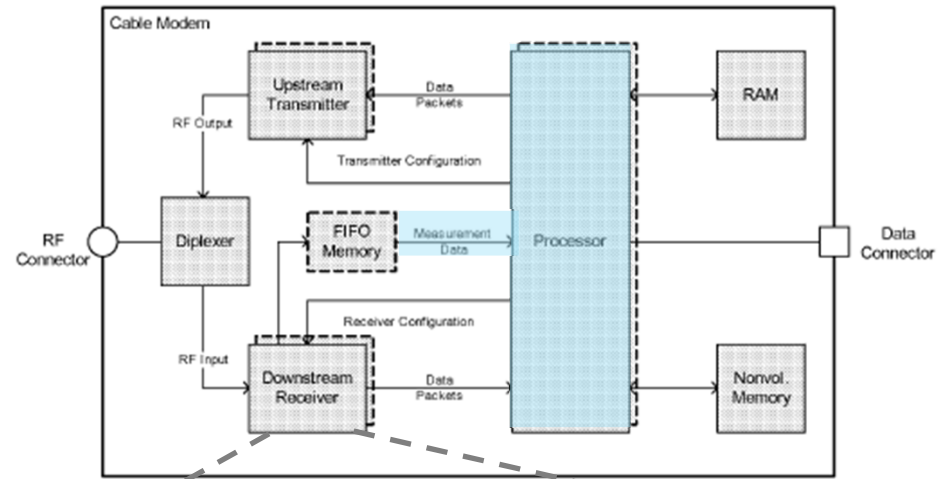


Fig. 1

Cable Modem Block Diagram Description

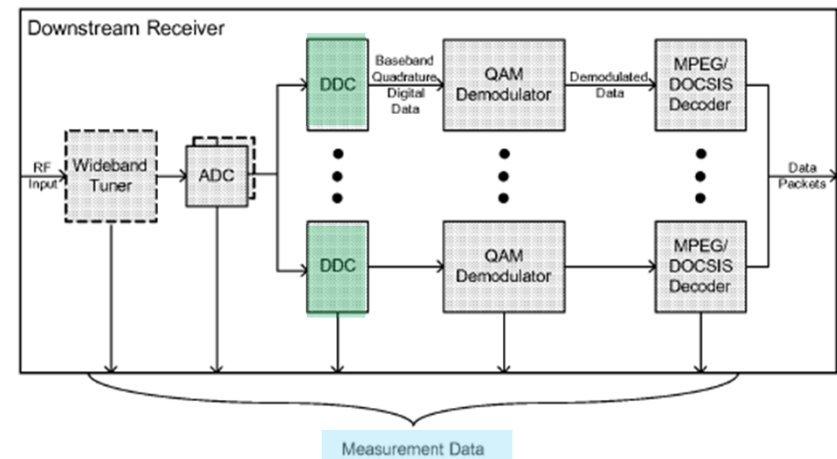


Fig. 2

(Pet., pp. 63-64; Ex. 1012, pp. 5-6; Ex. 1002 (Lett Declaration), ¶¶202-208)

“Concurrently Output”

- But the Petition Clearly Said Processor USES Components, Such as DDC and QAM Demodulator, to Make Measurements

(Pet., p. 63)

- Nothing in the Claim Precludes the “Signal Monitor” From Having Multiple Inputs Associated with Multiple Components

Renken describes an MCCM processor (claimed “signal monitor”) executing a measurement program to obtain signal measurements. Ex. 1011, 10:15-31; Fig. 2; Ex. 1012, pp. 5-6, Fig. 1 (p. 5); Ex. 1002, ¶ 202. For example, the measurement program can obtain spectrum-style measurements using the ADC, and can analyze data from various components to determine characteristics such as Bit Error Rate (BER), Signal-to-Noise Ratio (SNR), Modulation Error Ratio (MER) and Carrier-to-Noise Ratio (CNR). Ex. 1011, 3:11-20, 11:39-12:5, 13:6-15, 16:17-17:17; Ex. 1012, pp. 3-7, 14; Ex. 1002, ¶¶ 201-202. For example, the measurement program analyzes data from the MPEG/DOCSIS Decoder to determine characteristics such as BER. Ex. 1011, 13:8-21; Ex. 1012, pp. 7-8, 14; Ex. 1002, ¶ 202. The processor may also take signal measurements using other components, including the DDC and QAM Demodulator. Ex. 1011, 12:6-13:38; Ex. 1012, pp. 3-8, 13-15; Ex. 1002, ¶ 202.

(Reply, pp. 18-19)

MCCM Processor Uses Other Components

hardware processors. In one embodiment, the processor 50 runs a CM software program or programs responsible for all cable modem activities during its normal operation, including providing suitably processed customer data 11 to the TC 10 for transmitting over specified upstream DOCSIS channels, and receiving from the RC 20 and suitably processing demodulated downstream data 27 that were received by the MCCM 100 from CMTS 3 over specified downstream channels. In one embodiment, a measurement program executable by the processor 50 is stored in the NVM 70. In operation, this

(Pet., pp. 63-64; Ex. 1011 (Renken), 10:16-25, Fig. 2)

In operation, the DDC 22 of any idle receiver 21, i.e. the receiver 21 that is not currently in use by the MCCM 100 for receiving customer-directed data, may be used to perform various measurements under the direction of the controller 200, such as but not exclusively measurements of analog or digital channel level, downstream frequency response, I/Q Constellation plots, and ingress under the carrier. Alternatively, the two later measurements can be performed with the QAM demodulator 23. Controller 200 may also query control registers of the DDC 22 to obtain DDC gain values, which are then used for computing carrier level parameters and the like.

(Pet., pp. 63-64; Ex. 1011 (Renken), 12:38-48, Fig. 3)

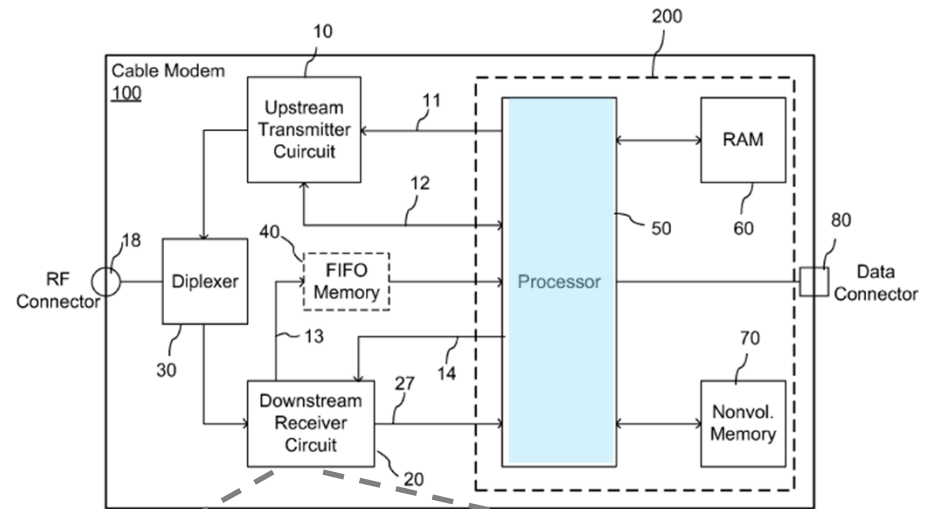


Fig. 2

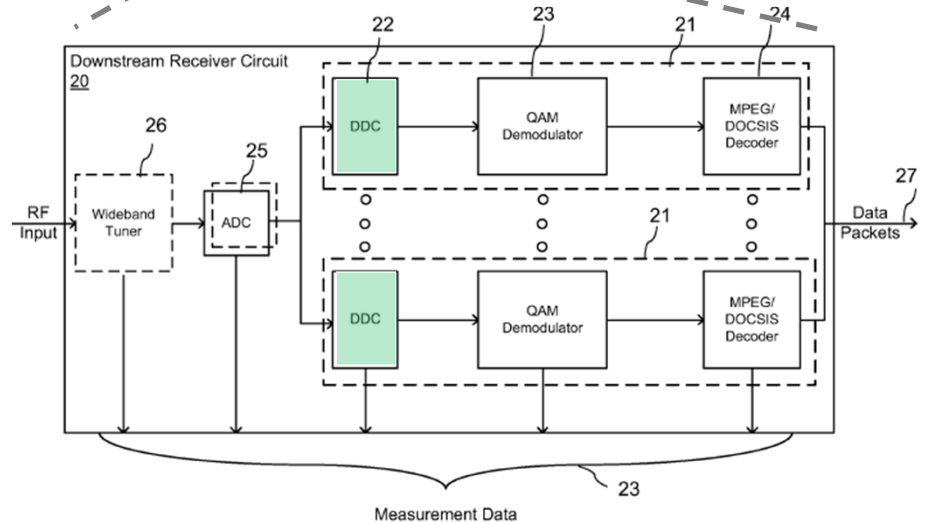


Fig. 3

MCCM Processor Uses Other Components

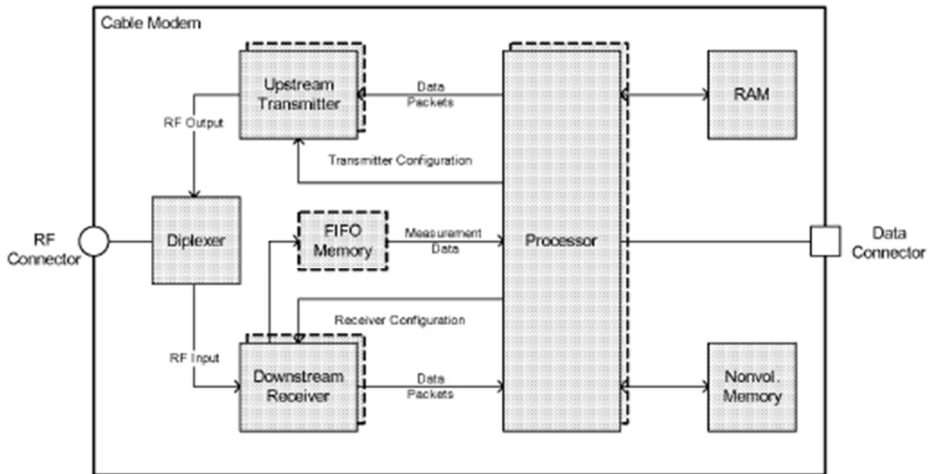


Fig. 1

Cable Modem Block Diagram Description

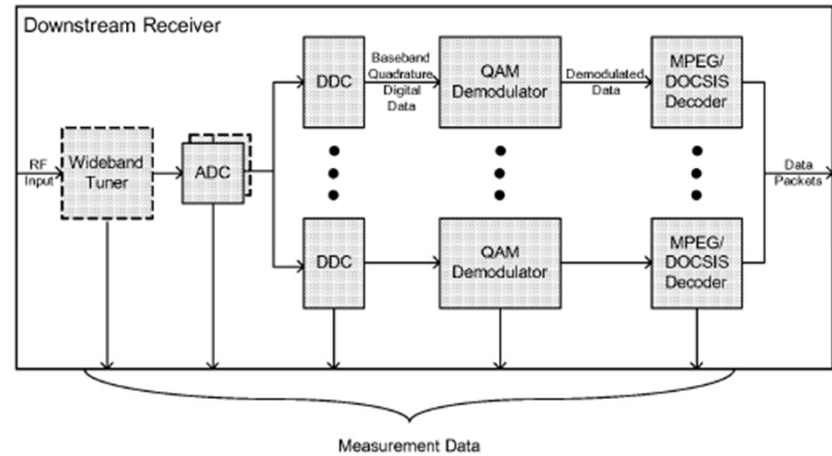


Fig. 2

(Pet., pp. 63-64; Ex. 1012 (Renken Provisional), pp. 5-6, Figs. 1, 2)

Processor:

The CM will have at least one processor that runs the software program responsible for all cable modem activities. The measurement program could reside on the same processor and run as separate tasks

(Pet., pp. 63-64; Ex. 1012 (Renken Provisional), p. 5)

increase as technology improves. Any extra unused DDCs can be used to perform measurements such as:

- Analog or digital channel level
- Downstream frequency response

(Pet., pp. 63-64; Ex. 1012 (Renken Provisional), p. 7)

Renken Qualifies as Prior Art

- “A provisional application’s effectiveness as prior art depends on its written description support for the claims of the issued patent of which it was a provisional.”
 - *Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1382 (Fed. Cir. 2015) (emphasis added)
- 35 U.S.C. 119(e)(1):
 - An application for patent filed under section 111(a) or section 363 for an invention disclosed in the manner provided by section 112(a) (other than the requirement to disclose the best mode) in a provisional application filed under section 111(b), by an inventor or inventors named in the provisional application, shall have the same effect, as to such invention, as though filed on the date of the provisional application filed under section 111(b), if the application for patent filed under section 111(a) or section 363 is filed not later than 12 months after the date on which the provisional application was filed and if it contains or is amended to contain a specific reference to the provisional application. ...

Renken Qualifies as Prior Art

- “A provisional application’s effectiveness as prior art depends on its written description support for the claims *of the issued patent of which it was a provisional.*”
 - *Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1382 (Fed. Cir. 2015) (emphasis added)
- The Petition Mapped, with Claim Charts, How Renken Claims 1 and 10 were Supported by the Renken Provisional (Pet., pp. 20-23)
- The POR Did Not Address Any Renken Claim, and Did Not Rebut the Identified Support of Claims 1 and 10 (POR, pp. 49-53)

PO Misapplied Dynamic Drinkware

- PO Incorrectly Assumes that in Order for Renken to QUALIFY as Prior Art, the Renken Provisional Must be ANTICIPATORY Prior Art (POR, pp. 49-53)
- *Dynamic Drinkware* Dealt with Anticipation Under 35 U.S.C. §102
 - Its Prior Art Provisional Needed to Show All Limitations of the Challenged Claim
- PO States: the provisional application must provide sufficient support for the subject matter relied upon for prior art purposes in the reference patent or published patent application. *Id.*, 1381-82. (POR, pp. 49-50)

PO Argues One Feature is Missing from the Renken Provisional

[1C] “... report said determined characteristic to a source of said received signal”

(POR, pp. 49-53; Ex. 1001
(‘008 Patent), cl. 1)

- Petition Cited Renken and the Renken Provisional for All Features (Pet., pp. 60-67)
- Only Feature that PO Alleges is not Shown in the Renken Provisional - Whether Results are Sent to the “Source of said Received Signal” (Headend) (POR, pp. 51-53)
- Renken Expressly States Sending Results to CMC at Headend

tem. Measurements are communicated to a central measurement controller, **for example located at the headend**, which collects measurements from a plurality of cable modems and the upstream measurement system. The resulting monitoring

(Ex. 1011 (Renken)
Abstract; Pet., pp. 63-64)

PO Argues One Feature is Missing from the Renken Provisional

[1C] “... report said determined characteristic to a source of said received signal”

- PO Argues Renken Provisional Does Not Disclose Sending Results to CMC at Headend

(POR. pp. 49-53; Ex. 1001
(‘008 Patent), cl. 1)

- Renken Provisional States Sending Results to CMC

measurement. However, provided that they are available, the cable modem will then step through the measurement plan and perform the requested measurements according to the provided plan parameters. Upon completion of the measurement plan, the cable modem will send the results to the CMC.

(Ex. 1012 (Renken Provisional),
p. 10; Pet., pp. 63-64)

- Renken Provisional Doesn’t Explicitly Say CMC is at Headend, But Author Doesn’t Know Where Else Results Would Go

2) Monitoring using the CPE but sending the results somewhere other than the head end (where, I don’t know...)

(Ex. 1012 (Renken Provisional), p. 4; Pet., pp. 63-64)

PO Argues One Feature is Missing from the Renken Provisional

[1C] “... report said determined characteristic to a source of said received signal”

(Ex. 1001 ('008 Patent), cl. 1)

- Accepting PO’s Argument, then the “CMC at Headend” in Renken is No Longer Among the “Subject Matter Relied Upon for Prior Art Purposes” per *Dynamic Drinkware* (Pet., pp. 63-64)
- All Other Features of the Renken Provisional, Cited in the Petition, Are Still There (Pet., pp. 60-67)

PO Argues One Feature is Missing from the Renken Provisional

[1C] “... report said determined characteristic to a source of said received signal”

(Ex. 1001 ('008 Patent), cl. 1)

- Petition Also Explained why Sending Results to the Headend Would Have Been Obvious

(Pet., pp. 60-67)

- In a Cable Network, Upstream Transmissions from a Cable Modem Arrive at the Headend

(Pet., pp. 60-67; Ex. 1002 (Lett Declaration), ¶206)

Mr. Lett:

206. In a cable network as described in Renken and the Renken Provisional, and as discussed in Section 9.1 above, a headend is on one end of the network of cables (the “upstream” end) and the various subscriber modems/set-top boxes are on the other end (the “downstream” end). The subscriber devices communicate with the headend. The headend transmits downstream signals onto the network of cables, for receipt by the subscriber modems/set-top boxes, and the subscriber modems/set-top boxes transmit upstream signals onto the network of cables, and they would be received by the headend. Ex. 1012, p. 5, Fig. 1. This is the general structure

PO's Secondary Considerations Lack a Nexus

- PO Bears Burden to Show Nexus Between Commercial Success and the Claim:
 - Presumptive if successful product is COEXTENSIVE with Claim,
 - Otherwise nexus requires proof the success is the DIRECT RESULT of the Unique Characteristics of the Claimed Invention
 - *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373-74 (Fed. Cir. 2019)

(Reply, pp. 25-26)

Secondary Considerations Lack a Nexus

- '008 Patent was Allowed Only After Adding “Report Said Determined Characteristic to a Source of Said Received Signal”
 1. (Currently Amended) A system comprising:
 - an analog-to-digital converter operable to digitize a 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.
- POR Does Not Identify Any Praise Directly Attributable to Reporting to a Source of the Received Signal

(Reply, p. 26; Ex. 1004 ('008 Prosecution History), p. 80; POR, pp. 62-67)

Broadcom was First

- PO Wants to Take Credit for Praise of Full-Band Capture (POR, pp. 62-64)
- But Broadcom's White Paper on Full-Band Capture (dated June 2011) PRECEDED the '008 Patent's September, 2011, Priority Date



White Paper

Full-Band Capture Cable Digital Tuning

Cable operators are demanding devices that support an increasing number of simultaneous channels, which translates to multiple cable tuners and demodulators in video media server and DOCSIS® 3.0 products in order to provide consumers with new high-bandwidth services, meeting consumer demand for TV everywhere and high-speed Internet throughout the connected home ecosystem. Traditional narrowband analog and wideband cable tuners are limited in their ability to effectively scale the number of channels due to cost, power, and size. Broadcom has introduced a ground-breaking new technology, Full-Band Capture Digital Tuning, that overcomes these limitations and delivers new advantages and features to OEMs, operators, and consumers. Full-Band Capture delivers the cable tuner density and performance that operators need to convert current cable systems to IP-based video platforms.

June 2011



e 1 of 6

ENTROPIC EXHIBIT 2006
Comcast v. Entropic
IPR2024-00441

(Reply, p. 25; Ex. 2006 ("Full-Band Capture Cable Digital Tuning"), p. 1)

Full-Band Capture “Instantly Resonated” for Monitoring

- Ex. 2009, Another Broadcom Paper Cited by PO, stated this:

About the same time that the industry was beginning to realize the significance of the upstream pre-eq breakthroughs another disruptive technology was launched in the form of downstream Full-Band Capture CPE. What this breakthrough enabled for HFC maintenance groups was essentially turning properly equipped CPE into remotely-accessible downstream spectrum analyzers. This resonated instantly across the industry which had been seeking an affordable method of deploying remotely-accessible field probes for the better part of a decade. Previous field probe proposals

(POR, pp. 63-64; Ex. 2009 (“The Full (Band) Story”), p. 5)

- “Resonated instantly” suggests that it was Obvious to use Full-Band Capture For Signal Monitoring Once it was Available
 - Broadcom’s June 2011 Paper (Ex. 2006) and Konstantinos Both Show Digitization of Full Band was Known

(Reply, pp. 24-25; Ex. 2006 (Broadcom “Full-Band Capture Cable Digital Tuning”), p. 1; Ex. 1010 (Konstantinos), ¶[043])

Documents Praise OTHERS, Not MaxLinear

- Ex. 2007, a DOCSIS Exhibit Cited by PO, Credits BROADCOM as the Industry Leader:

performance. The introduction in DOCSIS 3.0 of multiple bonded channels resulted in high sampling rate receiver implementations. Industry leaders such as Broadcom leverage CPE spectrum capture or full band capture (FBC)¹ from this feature and Comcast introduced it into their network management systems shortly after its availability.

¹ Generically speaking, the industry calls CPE spectrum capture full-band capture (FBC). MaxLinear calls it Full Spectrum Capture™ (FSC).

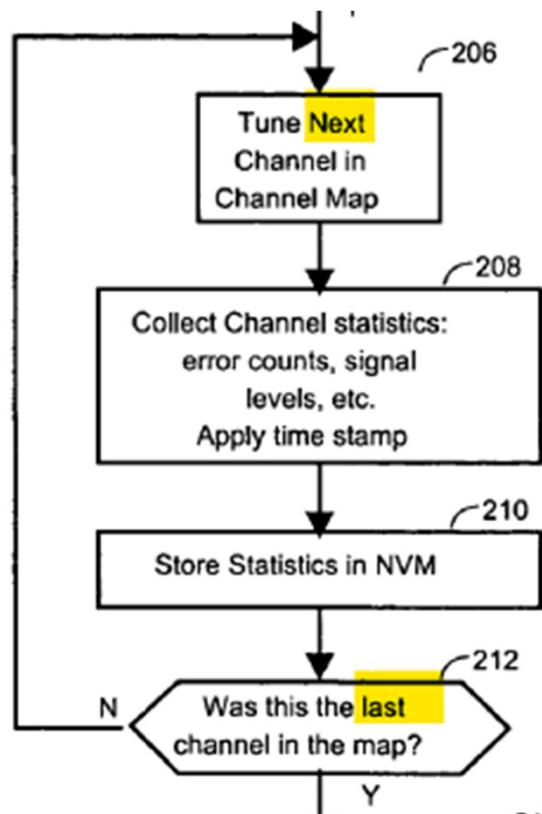
(Reply, p. 25; Ex. 2007 (“DOCSIS Best Practices and Guidelines”), p. 17; POR, pp. 64-65)

Ground A: Claim 2

- [2]: “The system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum.”

(Ex. 1001 ('008 Patent), cl. 2)

- Kamieniecki Desires to Monitor All Channels



last channel has been (Y) tuned. This provides coverage and health check for all of the channels. Then, in a step 214, the

Kamieniecki
[0015]

Kamieniecki
Fig. 2

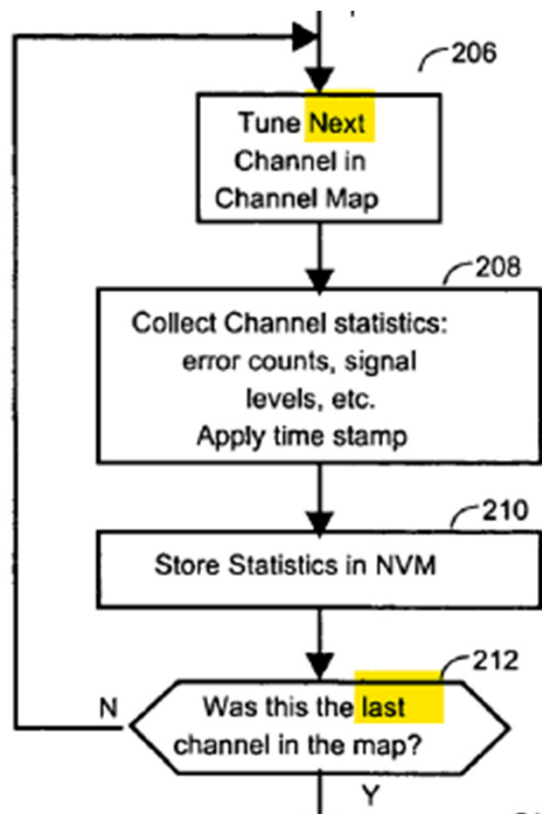
(Pet., pp. 44-45; Ex. 1009 (Kamieniecki), ¶[0015], Fig. 2; Ex. 1002 (Lett Declaration, ¶¶148-151))

Ground A: Claim 4

- [4]: “The method of claim 3, wherein said first portion comprises all of said received signal from Flo to Fhi.”

(Ex. 1001 ('008 Patent), cl. 4)

- Kamieniecki Desires to Monitor All Channels



last channel has been (Y) tuned. This provides coverage and health check for all of the channels. Then, in a step 214, the

Kamieniecki
[0015]

Kamieniecki
Fig. 2

(Pet., pp. 44-45, 47; Ex. 1009 (Kamieniecki), ¶[0015], Fig. 2; Ex. 1002 (Lett Declaration), ¶¶148-151, 159))

Ground A: Claim 5

- [5]: “The method of claim 3, wherein said one or more characteristics is one of: signal power vs. frequency, phase v. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.”

(Ex. 1001 (‘008 Patent), cl. 5)

- Kamieniecki’s Signal Level Estimates, For Each Channel, is “Signal Power v. Frequency”

[0007] According to an embodiment of the invention, signal quality in a cable network is monitored at selected ones of a plurality of set-top boxes (STBs) which monitor and collect information about signal quality. This information may include at least one of channel absence/presence, error count and **signal level estimates.**

- Also, Konstantinos Discloses Bit-Error-Rate and Signal-to-Noise Ratio

(Pet., pp. 47-49; Ex. 1009 (Kamieniecki), ¶[0007]; Ex. 1010 (Konstantinos), ¶[0109]; Ex. 1002 (Lett Declaration, ¶¶ 160-163))

Ground A: Claim 6

- [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.”

(Ex. 1001 ('008 Patent), cl. 6)

[0001] The present invention relates to cable broadcasting systems and, more particularly, to monitoring the quality of signals on a cable television network or the like.

(Pet. 49; Ex. 1009 (Kamieniecki), ¶[0001];
Ex. 1002 (Lett Declaration, ¶¶ 164-165))

izer. A composite broadband RF input signal (e.g. a cable TV signal consisting of multiple channels bundled together between 50-1000 MHz) is received at LNA/VGA 202 from a signal source. Here, the signal is pre-conditioned (amplified,

(Pet., pp. 49; Ex. 1010 (Konstantinos), ¶[0043];
Ex. 1002 (Lett Declaration, ¶¶ 164-165))

Grounds A & B: Claim 7

- [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 comprise a plurality of television channels.”

(Ex. 1001 ('008 Patent), cl. 7)

- Kamieniecki:

[0001] The present invention relates to cable broadcasting systems and, more particularly, to monitoring the quality of signals on a cable television network or the like.

(Pet. 50; Ex. 1009 (Kamieniecki), ¶[0001]; Ex. 1002 (Lett Declaration, ¶¶ 166-167))

[0010] The receiver can also include an antenna configured to receive the plurality of analog signals and a low-noise block (LNB) converter. The LNB converter can be configured to down-convert the plurality of analog signals received by the antenna to an L-band range of frequencies. The plurality of analog signals residing in the L-band range of frequencies can be subsequently processed by the down-converter device.

Yu (Ex. 1016)
“Scalable Satellite
Receiver System”

(Pet., pp. 50-51; Ex. 1016 (Yu), ¶[0010]; Ex. 1002 (Lett Declaration, ¶¶ 168-172))

Grounds A&B: Claim 8

- [8]: “The method of claim 7, wherein said one or more circuits reside in a customer premises satellite reception assembly.”

- Kamieniecki:

(Ex. 1001 ('008 Patent), cl. 8)

[0001] The present invention relates to cable broadcasting systems and, more particularly, to monitoring the quality of signals on a cable television network or the like.

(Pet. 50; Ex. 1009 (Kamieniecki), ¶[0001];
Ex. 1002 (Lett Declaration, ¶¶ 166-167))

[0007] An apparatus is needed for implementing a scalable satellite receiver system that minimizes circuit area and power consumption. Embodiments of the present invention include a receiver for a multi-channel communication system. The receiver can include a down-converter device, an analog-to-digital converter (ADC), and a plurality of digital channel selection devices. The down-converter device can be configured to down-convert a plurality of analog signals from

Yu (Ex. 1016)
“Scalable Satellite
Receiver System”

(Pet., pp. 50-51; Ex. 1016 (Yu), ¶[0007]; Ex.
1002 (Lett Declaration, ¶¶ 168-172))

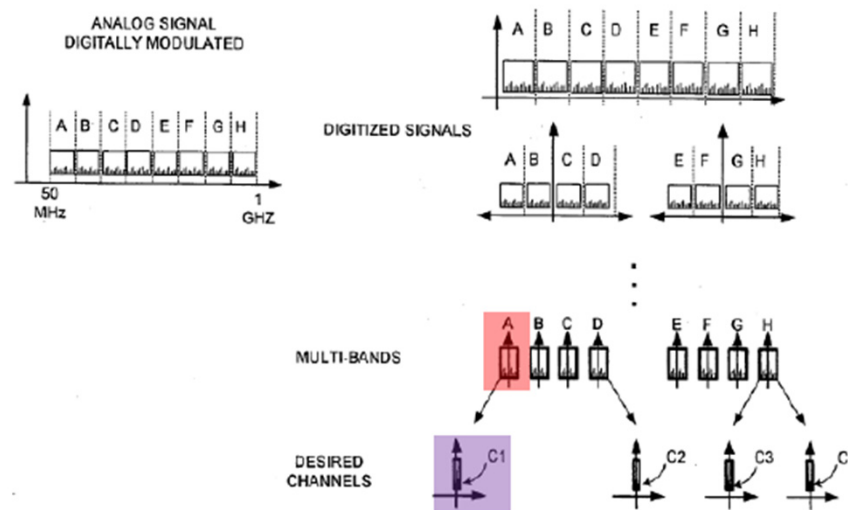
Ground A: Claim 10

- [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.”

(Ex. 1001 ('008 Patent), cl. 10)

- Konstantinos Shows Selecting Channels by their Bandwidths and Center Frequencies

FIG. 3



Ex. 1010, Fig. 3 (annotated)

pp. 53-56; Ex. 1010 (Konstantinos), Fig. 3; Ex. 1002 (Lett Declaration, ¶¶ 176-77))

Ground D: Claim 2

- [2]: “The system of claim 1, wherein said first portion of said digitized signal spans said entire television spectrum.”
- Renken Provisional:

The CMC can be configured to monitor various measurement results from across the entire downstream spectrum at any or all subscriber locations equipped with MCCMs. The CMC can do any of the following:

- Renken:

ponent Q. The input to DDC **22** is the digital IF data from the ADC **25**, which typically covers the **entire downstream frequency span of the wideband tuner 26**. The output of the DDC

(Pet., pp. 19, 67-68; Ex. 1012 (Renken Provisional), p. 4; Ex. 1011 (Renken), 1:7-10; 12:22-24;; 12:30-32 Ex. 1002 (Lett Declaration), ¶¶218-222)

Ground D: Claim 4

- [4]: “The method of claim 3, wherein said first portion comprises all of said received signal from Flo to Fhi.”
- Renken Provisional:

The CMC can be configured to monitor various measurement results from across the entire downstream spectrum at any or all subscriber locations equipped with MCCMs. The CMC can do any of the following:

- Renken:

ponent Q. The input to DDC **22** is the digital IF data from the ADC **25**, which typically covers the **entire downstream frequency span of the wideband tuner 26**. The output of the DDC

(Pet., pp. 19, 67-68, 70; Ex. 1012 (Renken Provisional), p. 4; Ex. 1011 (Renken), 1:7-10; 12:22-24;, 12:30-32 Ex. 1002 (Lett Declaration), 218-222, 230)

Ground D: Claim 5

- [5]: “The method of claim 3, wherein said one or more characteristics is one of: signal power vs. frequency, phase v. frequency, signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.”
- Renken Discloses Signal Level Measurements for Channels (“signal power vs. frequency”)

software of the MCCM 100 can support them. By way of example, a portion of the measurement capability list 350 pertaining to the Digital Measurement Capabilities may indicate whether the MCCM 100 is capable of performing the following non-exclusive list of digital measurements: Carrier level, MER, BER, DQI™, Ingress under the carrier, IQ sampling, Errored Seconds, Digital Hum. Here IQ sampling means capturing pairs of I and Q amplitudes at symbol times from the output of the DDC 22 in order to display or analyze a QAM constellation. The values at the symbol time may be

(Ex. 1011 (Renken), 17:11-20)

channels present in the downstream spectrum. These measurements include, for example, Video and Audio Carrier level measurement, Hum measurement, and Carrier to Noise Ratio (CNR) measurement, all of which can be performed by applying known in the art methods upon the digitized CATV signal extracted from the output of the ADC 25; see, for

(Ex. 1011 (Renken), 11:56-61)

- As Does Renken Provisional

Digital measurements such as Level, MER, Pre- and Post- Forward Error Correction (FEC) Bit Error Rate (BER), DQI (Digital Quality Index, defined in US Patent 7,792,183), Errored Seconds, Constellation, and Ingress under the carrier.

(Ex. 1012 (Renken Provisional), p. 4)

(Pet., pp. 71;; Ex. 1011 (Renken), 11:56-61; 17:11-20 Ex. 1012 (Renken Provisional), p. 4; Ex. 1002 (Lett Declaration, ¶¶ 231-233)

Ground D: Claim 6

- [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.”
- Renken Discusses its Cable Television (CATV) Signals

With reference to FIG. 1, there is shown an exemplary HFC network 1 including features of the present invention. HFC networks are commonly implemented to deliver **Cable Television (CATV)** signals, including analog TV signals and digital TV signals, as well as data and control signals, to customer premises such as a home or a business. In the HFC network 1,

The wideband tuner 26 is controlled by the controller 100 and enables the MCCM 100 to tune to a selected group of downstream channels. By way of example and depending on the implementation, a tuner's bandwidth may be as narrow as **6 MHz or as wide as 1 GHz**. The input into the tuner 26 is

(Pet., p. 19, 71-72; Ex. 1011 (Renken), 7:43-61; Ex. 1002 (Lett Declaration, ¶¶ 234-35)

(Pet., pp. 19,. 71-72; Ex. 1011 (Renken), 11:28-32; Ex. 1002 (Lett Declaration, ¶¶ 234-35)

- As Does the Renken Provisional

Using Cable Modems for CATV Network Monitoring

DOCSIS 3.0 compliant cable modems provide multiple downstream receivers and upstream transmitters. They have the ability to bond up to 8 channels in the downstream and 4 channels in the upstream so as to achieve high data transfer rates. Future versions of DOCSIS will require that cable modems bond an increasing number downstream and upstream channels.

(Pet., pp. 19,. 71-72; Ex. 1012 (Renken Provisional), p. 3; Ex. 1002 (Lett Declaration, ¶¶ 234-35)

Ground D: Claim 10

- [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.”

- Renken Discloses Selecting Channels In This Way:

The DDC 22 is responsible for filtering out, i.e. selecting, a particular downstream channel, such as a DOCSIS 6 or 8 MHz wide channel, from the digital IF output of the ADC 25. In one embodiment, it converts a digitized real-valued signal centered at the intermediate frequency to a baseband complex signal centered at a zero frequency as known in the art. This

- As Does the Renken Provisional:

Wideband Tuner:

The wideband tuner allows the CM to tune to a group of channels. Depending on the implementation, a tuner's bandwidth could be as narrow as 6 MHz or as wide as 1 GHz. The input into the tuner is analog RF data from the diplexer cutoff frequency to approximately 1 GHz. It converts RF signals at a band of frequencies to corresponding frequencies centered at an intermediate frequency (IF). A tuner is optional

(Pet., pp. 19, 73; Ex. 1011 (Renken), 12:22-27; Ex. 1012 (Renken Provisional), p. 6; Ex. 1002 (Lett Declaration, ¶¶ 238-41)

Ground E: Claims 9 and 17

- [9]/[17] “... wherein said one or more circuits reside in a customer premises gateway”
- The ‘008 Patent Describes its Gateway as Performing MODulation and DEModulation, Consistent with Renken’s MODEM

(Pet., pp. 72-73; Ex. 1001 (‘008 Patent), 2:62-65, 3:57-60, 4:59-62; Ex. 1002 (Lett Declaration, 236-37))

- The Claimed “Customer Premises Gateway” Reads on Renken’s Cable Modem

(Pet., pp. 72-73; Ex. 1011 (Renken), Figs. 1-2; Ex. 1002 (Lett Declaration), ¶236-37)

- POR Does Not Address or Rebut This
- Secondary Reference, Cholas, Shows it Was Known to Place Cable Modem in a Gateway

(Pet., pp. 72-73; Ex. 1017 (Cholas))

Independent Claims 1 and 11 Overlap, PO Does Not Argue Claim 11 Separately

(POR, p. 11)

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.

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.

Dependent Claims 12-18 Mirror Claims 4-10

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.

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.

PO: Lett Couldn't Identify How Many Channel Selectors

(POR, p. 22)

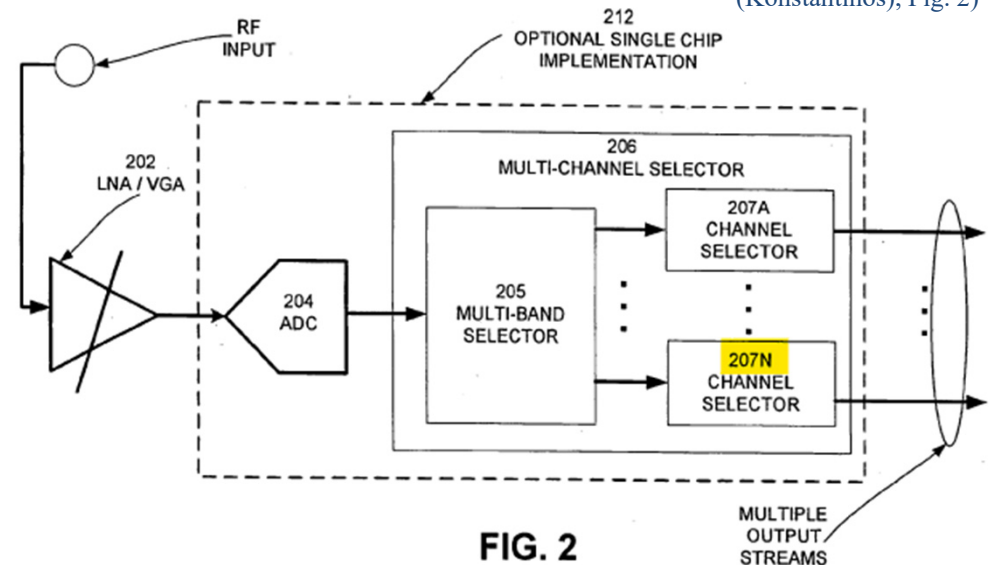
- Mr. Lett Simply Didn't Limit "N"

(Pet., p. 16, Reply, p. 4; Ex. 2014 (Lett Deposition), 150:7-13; Ex. 1010 (Konstantinos), Fig. 2)

7 Q. If we go back to Konstantinos and
8 look at that multi-channel receiver, there are
9 channel selectors A through N.

10 In your proposed combination, what
11 is that number N?

12 A. I didn't give a number, I don't
13 think in my declaration.



- Ex. 1002 (Lett Declaration), ¶79:

Ex. 1010, [0043], [0105]. Konstantinos gives examples in which sixteen (16) channels are simultaneously selected, and does not indicate this is a limit. Ex. 1010, [0046], [0106].

(Pet., p. 16; Reply, p. 4; Ex. 1010 (Konstantinos), ¶[0046])

PO Incorrectly Argues Lett Couldn't Identify Which Reference's Decoder is in the Combination

(POR, p. 22)

- Mr. Lett Said it Could be EITHER

(Reply, p. 4; Ex. 2014 (Lett Deposition), 159:6-11)

- BOTH References Disclose MPEG, Which Needs a Decoder

(Reply, p. 4; Pet., p. 40; Ex. 1002 (Lett Declaration), ¶135)

- Konstantinos Describes Decoders:

[0030] In still another embodiment, the multi-channel receiver further comprising one more **channel decoders**, wherein a channel decoder receives a channel signal from the channel selector. In yet another embodiment, the multi-channel receiver further comprising one or more source decoders, wherein a source decoder receives an output from a channel decoder.

(Pet., p. 40; Ex. 1010 (Konstantinos), ¶[0030])

21 Q. If one of skill in the art were
22 putting together your proposed combination

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1 set-top box, they are doing what you say they
2 would do, which is replace the in-band and
3 out-of-band tuners of Kamieniecki with the
4 multi-channel receiver of Konstantinos, the box
5 would have to have decoders.

6 **So would that person of skill in the**
7 **art take the decoders from the Konstantinos**
8 **disclosure or would it take the decoders from**
9 **what you say would be obvious in the**
10 **Kamieniecki disclosure?**

11 A. **It could be either.** It is just
12 obvious that we need multiple decoders and --
13 and Kamieniecki doesn't go into much detail
14 about MPEG decoding, right, so one would, you
15 know, he could -- he just knows that you have
16 to have multiple MPEG decoders if you are going
17 to output and view multiple channels and so,
18 you know, more details of that could be
19 rendered from Konstantinos and/or Ota or
20 perhaps a million other references.