

**Table 1 Comparing Select Sections of Almeroth Declaration (EX1002)
to Corresponding Sections of Petition (Paper 3)**

Section/Topic	Almeroth Declaration (EX1002)	Petition re: '756 Patent
<p>Grounds for Unpatentability:</p> <p>Overview and Motion to Combine</p>	<p>76. In my opinion, Chincholi in combination with Clegg renders claims 1-30 obvious. As discussed in more detail below, Chincholi teaches the same architecture as the '756 patent, including a wireless networking device with multiple transceivers, each having actual MAC and PHY interfaces. Chincholi uses a single "Opportunistic Multiple-Medium Access Control (MAC) Aggregation layer," positioned above the actual MAC-PHY layers of each transceiver, to aggregate available bandwidth portions to efficiently meet the requirements of data streams from one or more applications. (EX1005 ¶[0122-0123].)</p> <p>EX1002 ¶ 76.</p>	<p>Chincholi in combination with Clegg renders claims 1-30 obvious. As discussed in more detail below, Chincholi teaches the same architecture as the '756 patent, including a wireless networking device with multiple transceivers, each having actual MAC and PHY interfaces. Chincholi uses a single "Opportunistic Multiple-Medium Access Control (MAC) Aggregation layer," positioned above the actual MAC-PHY layers of each transceiver, to aggregate available bandwidth portions to efficiently meet the requirements of data streams from one or more applications. (EX1005 ¶[0122-0123]; EX1002 ¶76.)</p> <p>Petition at 11.</p>

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	<p>77. Chincholi teaches continuous monitoring of the “number of available resources on the medium” and techniques for distributing IP packets across the RATs accordingly. (EX1005 ¶[0161].) Chincholi’s approach enables the system to respond to bandwidth channels, or portions of bandwidth channels, becoming unavailable during transmission of a data stream. A POSITA would have understood that Chincholi’s monitoring and response techniques could be further enhanced by the teachings of Clegg. Clegg teaches techniques for addressing carrier-specific interference within bandwidth channels, allowing for any given channel full usage of the channel bandwidth that is not unavailable for communication. Like Chincholi, Clegg arises in the field 802.11 wireless communication networks and is addressed to increasing bandwidth efficiency. (EX1009 at 1:25-37.)</p> <p>78. A POSITA would have been motivated to incorporate the teachings of Clegg to improve the Chincholi system by allowing it to more flexibly and efficiently utilize available bandwidth channels that may experience carrier-specific interference within the channels. Chincholi already teaches dynamic allocation of contiguous or non-contiguous channels, and Clegg merely provides additional detail on how to mitigate carrier-specific interference within any given channel. The teachings of Clegg are complementary to Chincholi, and a POSITA would have recognized that Clegg’s teachings could be easily implemented into Chincholi without technical challenge.</p> <p>79. In the analysis below, the combined prior art system will be referred to as Chincholi/Clegg.</p> <p>EX1002 ¶ 77-79.</p>	<p>Chincholi teaches continuous monitoring of the “number of available resources on the medium” and techniques for distributing IP packets across the RATs accordingly. (EX1005 ¶[0161].) Chincholi’s approach enables the system to respond to bandwidth channels, or portions of bandwidth channels, becoming unavailable during transmission of a data stream. (EX1002 ¶77.) A POSITA would have understood that Chincholi’s monitoring and response techniques could be further enhanced by the teachings of Clegg. (EX1002 ¶77.) Clegg teaches techniques for addressing carrier-specific interference within bandwidth channels, allowing for any given channel full usage of the channel bandwidth that is not unavailable for communication. Like Chincholi, Clegg arises in the field 802.11 wireless communication networks and is addressed to increasing bandwidth efficiency. (EX1009 at 1:25-37.)</p> <p>A POSITA would have been motivated to incorporate the teachings of Clegg to improve the Chincholi system by allowing it to more flexibly and efficiently utilize available bandwidth channels that may experience carrier-specific interference within the channels. (EX1002 ¶78.) Chincholi already teaches dynamic allocation of contiguous or non-contiguous channels, and Clegg merely provides additional detail on how to mitigate carrier-specific interference within any given channel. (EX1002 ¶78.) The teachings of Clegg are complementary to Chincholi, and a POSITA would have recognized that Clegg’s teachings could be easily implemented into Chincholi without technical challenge. (EX1002 ¶78.)</p> <p>In the analysis below, the combined prior art system will be referred to as Chincholi/Clegg.</p> <p>Petition at 12-13</p>

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<p>Grounds for Unpatentability:</p> <p>Preamble</p>	<p>80. In my opinion, Chincholi/Clegg discloses “[s]ystems, methods, and instrumentalities... for managing multiple radio access technology (RAT) interfaces” (EX1005, Abstract; [0003]) and “enabl[ing] opportunistic RAT selection and aggregation for sending data traffic over the RAT interfaces.” (EX1005 ¶[0003].) “In multi-RAT systems reception and/or transmission may be performed over multiple RATs. For example, a network terminal (NT) (e.g., an access point (AP)...) and a wireless transmit/receive unit (WTRU)... may communicate over multiple parallel paths.” (EX1005 ¶[0002].)</p> <p>81. Chincholi discloses that a network terminal (“NT”), such as an access point, or a wireless transmit/receive unit (“WTRU”) “may be configured to work in an infrastructure mode or an adhoc mode, for example, in an IEEE802.11 based Wi-Fi system,” i.e., both are a wireless networking device. (EX1005 ¶[0115].) Thus, as discussed in the below limitations, Chincholi/Clegg discloses a wireless networking device.</p> <p>EX1002 ¶¶ 80-81.</p>	<p>Chincholi discloses “[s]ystems, methods, and instrumentalities... for managing multiple radio access technology (RAT) interfaces” (EX1005, Abstract; [0003]) and “enabl[ing] opportunistic RAT selection and aggregation for sending data traffic over the RAT interfaces.” (EX1005 ¶[0003]; EX1002 ¶80.) “In multi-RAT systems reception and/or transmission may be performed over multiple RATs. For example, a network terminal (NT) (e.g., an access point (AP)...) and a wireless transmit/receive unit (WTRU)... may communicate over multiple parallel paths.” (EX1005 ¶[0002].)</p> <p>Chincholi discloses that a network terminal (“NT”), such as an access point, or a wireless transmit/receive unit (“WTRU”) “may be configured to work in an infrastructure mode or an adhoc mode, for example, in an IEEE802.11 based Wi-Fi system,” i.e., both are a wireless networking device. (EX1005 ¶[0115].) Thus, as discussed in the below limitations, Chincholi/Clegg discloses a wireless networking device. (EX1002 ¶81.)</p> <p>Petition at 13-14.</p>

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<p>Grounds for Unpatentability:</p> <p>Claim 1(a)</p>	<p>83. <i>“an application providing a data stream”</i>: Chincholi discloses that “[u]sing multiple RATs simultaneously may provide the benefit of increased bandwidth for an <i>application</i> (e.g., an IP flow) as well as increased reliability.” (EX1005 ¶[0191].) The first data stream of a first application is referred to as an “IP flow.” (EX1005 ¶[0132] [<i>“A single IP flow may refer to a stream of IP packets belong to a particular application.”</i>].) In an 802.11 embodiment (Figure 5), IP packets associated with an application data stream come from or are destined to an IP layer 504, and thus the IP flow (<i>i.e. data stream</i>) is provided by the application when the wireless networking device is being used. (EX1005 ¶[0138]], Table 1 “[S]” interface is for “Incoming/Outgoing IP Packets”).) The “[S]” interface from the IP layer for the IP stream is therefore an <i>application interface associated with a first application</i>.</p> <p>EX1002 ¶ 83 (identical figure omitted).</p>	<p><i>“an application providing a data stream”</i>: Chincholi discloses that “[u]sing multiple RATs simultaneously may provide the benefit of increased bandwidth for an <i>application</i> (e.g., an IP flow) as well as increased reliability.” (EX1005 ¶[0191]; EX1002 ¶¶82-83.) The first data stream of a first application is referred to as an “IP flow.” (EX1005 ¶[0132] [<i>“A single IP flow may refer to a stream of IP packets belong to a particular application.”</i>].) In an 802.11 embodiment (Figure 5), IP packets associated with an application data stream come from or are destined to an IP layer 504, and thus the IP flow (<i>i.e. data stream</i>) is provided by the application when the wireless networking device is being used. (EX1005 ¶[0138]], Table 1 “[S]” interface is for “Incoming/Outgoing IP Packets”).) The “[S]” interface from the IP layer for the IP stream is therefore an <i>application interface associated with a first application</i>. (EX1002 ¶83.)</p> <p>Petition at 14-15.</p>

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	<p>84. "a processing interface configured to, during use of the wireless networking device, interact with an application": Chincholi further discloses that its "application interface" is connected to and interacts with a "processing interface." Chincholi's processing interface is referred an "Opportunistic Multiple-Medium Access Control (MAC) Aggregation (OMMA) layer." (EX1005 ¶[0003].) A POSITA would have understood that the plain meanings of "interface" and "layer" in the context of the '756 patent are congruent, which is underscored by the specification describing layers having the same functionality as the claimed interfaces, and the prosecution history, where Applicant interchangeably used the terms "layer" and "interface" to describe Figure 1. (EX1017, 8/8/23 Response to Non-Final Office Action). The OMMA layer is a common layer/module between the IP layer/module and the multiple RAT layers/modules. (EX1005 ¶[0137]; <i>see also id.</i> ¶[0120] ("[T]he single thin software layer may enable one RAT to operate over industrial scientific medical (ISM) and another RAT to operate over a TVWS band for the same IP flow.")) An exemplary OMMA layer enabling a dual-RAT aggregation device in a 802.11n network is shown in Figure 5:</p> <p>85. The IP layer is connected to the OMMA layer and provides IP packets that the OMMA layer processes. (EX1005 ¶[0138]) The OMMA "may allow for enhanced throughput and reduced latency for a single IP flow." (EX1005 ¶[0120].) The OMMA layer is therefore a processing layer, which processes IP packets and provides an interface between the IP layer and actual MAC layers, i.e., a processing interface.</p> <p>86. "application... having a wireless bandwidth requirement": Chincholi teaches "a bandwidth requirement for an IP flow." (EX1005 ¶[260].)</p> <p>EX1002 ¶¶ 84-86 (identical figure omitted).</p>	<p>"a processing interface configured to, during use of the wireless networking device, interact with an application": Chincholi further discloses that its "application interface" is connected to and interacts with a "processing interface." (EX1002 ¶84.) Chincholi's processing interface is referred an "Opportunistic Multiple-Medium Access Control (MAC) Aggregation (OMMA) layer." (EX1005 ¶[0003].) A POSITA would have understood that the plain meanings of "interface" and "layer" in the context of the '756 patent are congruent, which is underscored by the specification describing layers having the same functionality as the claimed interfaces, and the prosecution history, where Applicant interchangeably used the terms "layer" and "interface" to describe Figure 1. (EX1002 ¶84; EX1017, 8/8/23 Response to Non-Final Office Action). The OMMA layer is a common layer/module between the IP layer/module and the multiple RAT layers/modules. (EX1005 ¶[0137]; <i>see also id.</i> ¶[0120] ("[T]he single thin software layer may enable one RAT to operate over industrial scientific medical (ISM) and another RAT to operate over a TVWS band for the same IP flow.")) An exemplary OMMA layer enabling a dual-RAT aggregation device in a 802.11n network is shown in Figure 5:</p>

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		<p>The IP layer is connected to the OMMA layer and provides IP packets that the OMMA layer processes. (EX1005 ¶[0138]); (EX1002 ¶85.) The OMMA “may allow for enhanced throughput and reduced latency for a single IP flow.” (EX1005 ¶[0120].) The OMMA layer is therefore a processing layer, which processes IP packets and provides an <i>interface</i> between the IP layer and actual MAC layers, <i>i.e.</i>, a <i>processing interface</i>.</p> <p>“application... having a wireless bandwidth requirement”: Chincholi teaches “a bandwidth requirement for an IP flow.” (EX1005 ¶[260]; EX1002 at ¶86.)</p> <p>Petition at 15-17 (identical figure omitted).</p>
<p>Grounds for Unpatentability: Claim 1(b)</p>	<p>87. In my opinion, Chincholi/Clegg discloses this limitation. Chincholi discloses first and second <i>actual MAC interfaces</i> connected to the processing interface (<i>i.e.</i>, the common OMMA layer). Figure 5, for example, depicts a “dual-RAT aggregation” with the common OMMA layer existing above and connected to two RATs 501a and 501b, which comprise first and second actual MAC interfaces 502, respectively. (EX1005 ¶[0138] (“The RATs 501a, 501b may comprise a MAC layer/module 502 and one or more physical layers/modules 503.”).)</p> <p>EX1002 ¶ 87 (identical figure omitted).</p>	<p>Chincholi discloses first and second <i>actual MAC interfaces</i> connected to the processing interface (<i>i.e.</i>, the common OMMA layer). Figure 5, for example, depicts a “dual-RAT aggregation” with the common OMMA layer existing above and connected to two RATs 501a and 501b, which comprise first and second actual MAC interfaces 502, respectively. (EX1005 ¶[0138] (“The RATs 501a, 501b may comprise a MAC layer/module 502 and one or more physical layers/modules 503.”); EX1002 ¶87.)</p> <p>Petition at 17 (identical figure omitted).</p>
<p>Grounds for Unpatentability: Claim 1(c)</p>	<p>88. In my opinion, Chincholi/Clegg discloses this limitation. Each RAT in Chincholi comprises <i>one or more physical layers</i>. (EX1005 ¶[0138] (“The RATs 501a, 501b may comprise a MAC layer/module 502 and <i>one or more physical layers/modules 503</i>.”).) The actual PHY layers are respectively connected to the <i>actual MAC interfaces</i>.</p> <p>EX1002 ¶ 88 (identical figure omitted).</p>	<p>Each RAT in Chincholi comprises <i>one or more physical layers</i>. (EX1005 ¶[0138] (“The RATs 501a, 501b may comprise a MAC layer/module 502 and <i>one or more physical layers/modules 503</i>.”); EX1002 ¶88.) The actual PHY layers are respectively connected to the actual MAC interfaces.</p> <p>Petition at 18 (identical figure omitted).</p>

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<p>Grounds for Unpatentability:</p> <p>Claim 1(d)</p>	<p>90. "first and second wireless transceivers respectively associated with the first and second actual PHY interfaces... suitable for use in a wireless local area network": Chincholi Figure 5 illustrates that each actual PHY interface of each RAT is associated with an antenna/radio frequency (RF) front-end pair. (EX1005 ¶[0133].) The antenna/radio frequency (RF) front-end pairs in Figure 5 include first and second transceivers.</p> <p>91. A POSITA would have understood that a "transceiver" is a physical device that can both transmit and receive information. Thus, each of Chincholi's disclosed "antenna/RF front-end pairs" are a transceiver because they operate on wireless protocols that both transmit and receive data, such as IEEE802.11, IEEE802.11ac, IEEE802.11af, LTE, WCDMA, etc. (EX1005 ¶[0134].)</p> <p>92. A POSITA would have further understood that the transceivers in Figure 5 would be associated with the actual PHY layer of each respective RAT, as the PHY layer is understood as the physical connection between a transceiver and the rest of the RAT.</p> <p>93. Chincholi also teaches that each RAT may be implemented as a Wi-Fi RAT, and thus their associated transceivers are suitable for use in a wireless local area network. (EX1005 ¶[0134].)</p>	<p>"first and second wireless transceivers respectively associated with the first and second actual PHY interfaces... suitable for use in a wireless local area network": Chincholi Figure 5 illustrates that each actual PHY interface of each RAT is associated with an antenna/radio frequency (RF) front-end pair. (EX1005 ¶[0133]; EX1002 ¶¶89-90.) The antenna/radio frequency (RF) front-end pairs in Figure 5 include first and second transceivers.</p> <p>A POSITA would have understood that a "transceiver" is a physical device that can both transmit and receive information. (EX1002 ¶91.) Thus, each of Chincholi's disclosed "antenna/RF front-end pairs" are a transceiver because they operate on wireless protocols that both transmit and receive data, such as IEEE802.11, IEEE802.11ac, IEEE802.11af, LTE, WCDMA, etc. (EX1005 ¶[0134].)</p> <p>A POSITA would have further understood that the transceivers in Figure 5 would be associated with the actual PHY layer of each respective RAT, as the PHY layer is understood as the physical connection between a transceiver and the rest of the RAT. (EX1002 ¶92.)</p> <p>Chincholi also teaches that each RAT may be implemented as a Wi-Fi RAT, and thus their associated transceivers are suitable for use in a wireless local area network. (EX1005 ¶[0134]; EX1002 ¶93.)</p>

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	<p>94. <i>"the first and second wireless transceivers... respectively have first and second bandwidth availabilities up to first and second actual bandwidths":</i> A POSITA would have recognized that each transceiver has an "actual" bandwidth (i.e., total bandwidth of the transceiver) with a "bandwidth availability" that may be a subset of the actual bandwidth (i.e., sub-portions of the total bandwidth that are available for use). Indeed, as Chincholi teaches, the RATs associated with each transceiver provide "meta-data feedback" allowing the OMMA layer to split IP packets amongst the RATs based on their available bandwidth. (EX1005 ¶[0138]; ¶[0161] (listing "Channel bandwidth(s)" sent by the PHY layer as an example of "feedback metric[] used by an OMMA layer"); see also id. ¶[0167] ("At startup, the OMMA layer may receive the available bandwidth of each of the one or more RATs.")) Thus, Chincholi discloses that each of the two transceivers has a bandwidth availability up to an actual bandwidth.</p> <p>95. <i>"the first and second wireless transceivers... adapted to respectively emit radio waves in first and second different bands of frequencies":</i> Chincholi discloses that each of the transceivers may be adapted to emit radio waves in respective different bands of frequencies. In the context of Figure 4, for example, Chincholi discloses that "[f]or multiple RATs 401, each RAT 401 may be operating on a specific band. For example, a 802.11n PHY/MAC operating over 2.4GHz ISM band, a 802.11af PHY/MAC operating over 512 MHz-698 MHz TVWS band, an LTE RAT operating of a licensed band (e.g., 700 MHz band), a Bluetooth RAT operating on 2.4 GHz ISM band, etc." (EX1005 ¶[0135].)</p> <p>EX1002 ¶¶ 90-95.</p>	<p><i>"the first and second wireless transceivers... respectively have first and second bandwidth availabilities up to first and second actual bandwidths":</i> A POSITA would have recognized that each transceiver has an "actual" bandwidth (i.e., total bandwidth of the transceiver) with a "bandwidth availability" that may be a subset of the actual bandwidth (i.e., sub-portions of the total bandwidth that are available for use). (EX1002 ¶94.) Indeed, as Chincholi teaches, the RATs associated with each transceiver provide "meta-data feedback" allowing the OMMA layer to split IP packets amongst the RATs based on their available bandwidth. (EX1005 ¶[0138]; ¶[0161] (listing "Channel bandwidth(s)" sent by the PHY layer as an example of "feedback metric[] used by an OMMA layer"); see also id. ¶[0167] ("At startup, the OMMA layer may receive the available bandwidth of each of the one or more RATs.")) Thus, Chincholi discloses that each of the two transceivers has a bandwidth availability up to an actual bandwidth.</p> <hr/> <p><i>"the first and second wireless transceivers... adapted to respectively emit radio waves in first and second different bands of frequencies":</i> Chincholi discloses that each of the transceivers may be adapted to emit radio waves in respective different bands of frequencies. (EX1002 ¶95.) In the context of Figure 4, for example, Chincholi discloses that "[f]or multiple RATs 401, each RAT 401 may be operating on a specific band. For example, a 802.11n PHY/MAC operating over 2.4GHz ISM band, a 802.11af PHY/MAC operating over 512 MHz-698 MHz TVWS band, an LTE RAT operating of a licensed band (e.g., 700 MHz band), a Bluetooth RAT operating on 2.4 GHz ISM band, etc." (EX1005 ¶[0135].)</p> <p>Petition at 19-22.</p>

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<p>Grounds for Unpatentability: Claim 1(e)</p>	<p>96. In my opinion, Chincholi/Clegg discloses this limitation. According to the '756 patent, the virtual MAC layers "enable[s] simultaneous allocation of multiple PHY resources for different signal types associated with different applications." (EX1001 at 3:52-60.) The virtual MAC layer comprises the functionality of "decision," "processing," and "ultra streaming" blocks. (EX1001 at 4:50-57.) The patent does not disclose or describe a generic "resource monitoring interface."</p> <p>97. The patent's description of the "virtual PHY layer" provides that a virtual PHY may include multiple RF blocks, each representing the virtual use of some set of allocated transceiver resources. (EX1001 at 4:50-57; see also Fig. 3 (depicting two RF blocks associated with "two sets" of transceiver resources).) "By employing a virtual MAC and virtual PHY between an application layer and an actual MAC and PHY layer, wireless transceiver resources may be allocated more efficiently to handle various data bandwidth requirements from different applications." (EX1001 at 6:4-8.)</p>	<p>According to the '756 patent, the virtual MAC layers "enable[s] simultaneous allocation of multiple PHY resources for different signal types associated with different applications." (EX1001 at 3:52-60.) The virtual MAC layer comprises the functionality of "decision," "processing," and "ultra streaming" blocks. (EX1001 at 4:50-57.) The patent does not disclose or describe a generic "resource monitoring interface." (EX1002 ¶96.)</p> <p>The patent's description of the "virtual PHY layer" provides that a virtual PHY may include multiple RF blocks, each representing the virtual use of some set of allocated transceiver resources. (EX1001 at 4:50-57; see also Fig. 3 (depicting two RF blocks associated with "two sets" of transceiver resources); EX1002 ¶97.) "By employing a virtual MAC and virtual PHY between an application layer and an actual MAC and PHY layer, wireless transceiver resources may be allocated more efficiently to handle various data bandwidth requirements from different applications." (EX1001 at 6:4-8.)</p>

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	<p>98. First, Chincholi discloses that the OMMA (i.e., the processing interface) includes the claimed “virtual MAC interface” formed within it. Indeed, “OMMA” is an abbreviation for “opportunistic multi-medium access control (MAC) aggregation,” which refers to the fact that the OMMA layer aggregates multiple MAC interfaces, as depicted in Figure 5 (EX1005 ¶[0120].) The OMMA layer includes an interface acting as a “virtual MAC interface” because it transparently “distributes and/or combines” packets between the IP layer and the RATs. (EX1005 ¶[0192].) A POSITA would have recognized that this “virtualizes” a MAC interface because the OMMA would effectively appear to the IP layer as a single interface for exchanging packets that are ultimately sent or received by the actual MAC-PHY pairs.</p> <p>99. Chincholi’s OMMA layer also includes all of the functionality that the '756 patent associates with the “virtual MAC interface.” Specifically, Figure 6 of Chincholi is a block diagram of an OMMA layer, comprising an IP QoS Scheduler 603, a MAC Resource Reservation module 602, and a Traffic Shaping Module 601. (EX1005 ¶[0139].)</p>	<p>First, Chincholi discloses that the OMMA (i.e., the processing interface) includes the claimed “virtual MAC interface” formed within it. Indeed, “OMMA” is an abbreviation for “opportunistic multi-medium access control (MAC) aggregation,” which refers to the fact that the OMMA layer aggregates multiple MAC interfaces, as depicted in Figure 5. (EX1005 ¶[0120].) The OMMA layer includes an interface acting as a “virtual MAC interface” because it transparently “distributes and/or combines” packets between the IP layer and the RATs. (EX1005 ¶[0192].) A POSITA would have recognized that this “virtualizes” a MAC interface because the OMMA would effectively appear to the IP layer as a single interface for exchanging packets that are ultimately sent or received by the actual MAC-PHY pairs. (EX1002 ¶98.)</p> <p>Chincholi’s OMMA layer also includes all of the functionality that the '756 patent associates with the “virtual MAC interface.” (EX1002 ¶99.) Specifically, Figure 6 of Chincholi is a block diagram of an OMMA layer, comprising an IP QoS Scheduler 603, a MAC Resource Reservation module 602, and a Traffic Shaping Module 601. (EX1005 ¶[0139].)</p>

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	<p>100. The IP QoS Scheduler classifies incoming packets of a packet stream, and may segregate them into distinct IP QoS streams (EX1005 ¶[0143]), which a POSITA would have recognized to fulfill the functionality of the “decision block” (EX1001 at 3:31-34). The MAC Resource Reservation module determines the time duration or spectral fragment/bandwidth required by a packet or set of packets (EX1005 ¶[0142]), which a POSITA would have recognized to fulfill the functionality of the “processing block” (EX1001 at 3:34-36). Finally, the Traffic Shaping module determines the way packets are routed across RATs using either policy based routing or feedback based routing (EX1005 ¶[0139]), which a POSITA would have recognized to fulfill the functionality of the “ultra-streaming block” (EX1001 at 3:36-40). Thus, a POSITA would have recognized that Chincholi’s OMMA layer includes a “<i>virtual MAC interface</i>.”</p> <p>101. <i>Second</i>, Chincholi discloses that its processing interface comprises the “<i>at least one resource monitoring interface formed in the processing interface</i>” that, during operation, feeds information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface. A POSITA would understand that the “resource monitoring interface formed in the processing interface” requires merely a component capable of receiving feedback statistics regarding the available resources of the wireless transceivers.</p>	<p>The IP QoS Scheduler classifies incoming packets of a packet stream, and may segregate them into distinct IP QoS streams (EX1005 ¶[0143]), which a POSITA would have recognized to fulfill the functionality of the “decision block” (EX1002 ¶100; <i>see also</i> EX1001 at 3:31-34). The MAC Resource Reservation module determines the time duration or spectral fragment/bandwidth required by a packet or set of packets (EX1005 ¶[0142]), which a POSITA would have recognized to fulfill the functionality of the “processing block” (EX1002 ¶100; <i>see also</i> EX1001 at 3:34-36). Finally, the Traffic Shaping module determines the way packets are routed across RATs using either policy based routing or feedback based routing (EX1005 ¶[0139]), which a POSITA would have recognized to fulfill the functionality of the “ultra-streaming block” (EX1002 ¶100; <i>see also</i> EX1001 at 3:36-40). Thus, a POSITA would have recognized that Chincholi’s OMMA layer includes a “<i>virtual MAC interface</i>.” (EX1002 ¶100.)</p> <p><i>Second</i>, Chincholi discloses that its processing interface comprises the “<i>at least one resource monitoring interface formed in the processing interface</i>” that, during operation, feeds information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface. A POSITA would understand that the “resource monitoring interface formed in the processing interface” requires merely a component capable of receiving feedback statistics regarding the available resources of the wireless transceivers. (EX1002 ¶101.)</p>

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	<p>102. Chincholi discloses the capability of receiving feedback statistics regarding the available resources of the wireless transceivers. Specifically, the traffic shaping module of the OMMA (i.e., part of the "virtual MAC interface") may determine packet routing using "feedback based routing." (EX1005 ¶[0139].) In feedback based routing, "the OMMA transmitter may use measurement metrics fed back from each RAT," which include "channel quality metrics and the <i>number of available resources on the medium</i>," i.e. information regarding bandwidth availabilities. (EX1005 ¶[0161].)</p> <p>103. Figures 28, 29, and their associated descriptions describe how Chincholi collects feedback from each RAT for the traffic shaping module. Figure 28 illustrates how the OMMA layer includes an OMMA Controller, which interfaces with each RAT to collect metrics regarding the channel quality and number of resources available on the medium. Specifically, using interface A2 in Figure 28, "[a] RAT (e.g., <i>each RAT</i>) may provide feedback metrics (e.g., a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller 2900 <i>per device (e.g., WTRU or NT) per access category supported at that RAT.</i>" (EX1005 ¶[0205].)</p>	<p>Chincholi discloses the capability of receiving feedback statistics regarding the available resources of the wireless transceivers. (EX1002 ¶102.) Specifically, the traffic shaping module of the OMMA (i.e., part of the "virtual MAC interface") may determine packet routing using "feedback based routing." (EX1005 ¶[0139].)</p> <p>In feedback based routing, "the OMMA transmitter may use measurement metrics fed back from each RAT," which include "channel quality metrics and the <i>number of available resources on the medium</i>," i.e. information regarding bandwidth availabilities. (EX1005 ¶[0161].)</p> <p>Figures 28, 29, and their associated descriptions describe how Chincholi collects feedback from each RAT for the traffic shaping module. (EX1002 ¶103.) Figure 28 illustrates how the OMMA layer includes an OMMA Controller, which interfaces with each RAT to collect metrics regarding the channel quality and number of resources available on the medium. Specifically, using interface A2 in Figure 28, "[a] RAT (e.g., <i>each RAT</i>) may provide feedback metrics (e.g., a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller 2900 <i>per device (e.g., WTRU or NT) per access category supported at that RAT.</i>" (EX1005 ¶[0205].)</p>

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	<p>104. The OMMA Controller includes a <i>Feedback Device Classifier module 2930</i> (EX1005 ¶[0205].) The Feedback Device Classifier collects information regarding the first and second transceiver resources/requirements over the "A2" interfaces in the diagram above so that this information may be provided to the OMMA Scheduler (i.e., the virtual MAC interface). Specifically, "[a] RAT (e.g., each RAT) may provide feedback metrics (e.g., a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller 2900 per device (e.g., WTRU or NT) per access category supported at that RAT." A POSITA would have recognized that the ability of the <i>Feedback Device Classifier</i> module of the OMMA Controller to collect feedback per device, per access category supported by each RAT discloses the "<i>resource monitoring interface</i>" as claimed by the '756 patent. The Feedback Device Classifier provides feedback, including information regarding the first and second bandwidth availabilities to the virtual MAC interface.</p> <p>EX1002 ¶¶ 95-104 (identical figures omitted).</p>	<p>The OMMA Controller includes a <i>Feedback Device Classifier module 2930</i> (EX1005 ¶[0205].) The Feedback Device Classifier collects information regarding the first and second transceiver resources/requirements over the "A2" interfaces in the diagram above so that this information may be provided to the OMMA Scheduler (i.e., the virtual MAC interface). Specifically, "[a] RAT (e.g., each RAT) may provide feedback metrics (e.g., a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller 2900 per device (e.g., WTRU or NT) per access category supported at that RAT." A POSITA would have recognized that the ability of the <i>Feedback Device Classifier</i> module of the OMMA Controller to collect feedback per device, per access category supported by each RAT discloses the "<i>resource monitoring interface</i>" as claimed by the '756 patent (EX1002, ¶104.) The Feedback Device Classifier provides feedback, including information regarding the first and second bandwidth availabilities to the virtual MAC interface. (EX1002, ¶104.)</p> <p>Petition at 22-28 (identical figures omitted).</p>
<p>Grounds for Unpatentability: Claim 1(f)</p>	<p>105. In my opinion, Chincholi/Clegg discloses this limitation. Chincholi discloses that its OMMA layer (i.e., processing interface), including the virtual MAC interface, is configured to operate in a manner transparent to any higher layer. For example, Chincholi discloses that "[t]he OMMA layer may be transparent, in that it distributes and/or combines packets from different RATs and forwards the packets to the IP layer." (EX1005 ¶[0192], ¶[0126].) This is as opposed to a "non-transparent" configuration in which the OMMA layer would "add[] additional headers at the transmitter, and/or reads and removes the headers at the receiver." (EX1005 ¶[0126].)</p>	<p>Chincholi discloses that its OMMA layer (i.e., processing interface), including the virtual MAC interface, is configured to operate in a manner transparent to any higher layer. (EX1002 ¶105.) For example, Chincholi discloses that "[t]he OMMA layer may be transparent, in that it distributes and/or combines packets from different RATs and forwards the packets to the IP layer." (EX1005 ¶[0192], ¶[0126].) This is as opposed to a "non-transparent" configuration in which the OMMA layer would "add[] additional headers at the transmitter, and/or reads and removes the headers at the receiver." (EX1005 ¶[0126].)</p> <p>Petition at 28-29.</p>

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<p>Grounds for Unpatentability:</p> <p>Claim 1(g)</p>	<p>EX1002 ¶ 105.</p> <p>106. In my opinion, Chincholi/Clegg discloses this limitation. Chincholi discloses techniques for network terminals and WTRUs to discover one another using active and passive scanning procedures. (EX1005 ¶[0145].) After an authentication procedure, Chincholi discloses that WTRUs may transmit a request to associate with one or more RATs of the network terminal and the network terminal may provide an association response signal accepting or rejecting the request of the WTRU. (EX1005 ¶[0149].) A POSITA would have recognized these scanning procedures disclose the ability of Chincholi's OMMA layer to request or create a first association between a recipient and the first actual MAC and PHY interfaces and a second association between the recipient and the second actual MAC and PHY interfaces.</p> <p>107. When operating transparently with respect to higher layers, see limitation 1[f], Chincholi's OMMA layer handles the request/response and creation of associations with WTRUs. (EX1005 ¶[0127] "[A]ssociation request/response frames may be updated by the OMMA layer to include OMMA device discovery parameters, for example, such as but not limited to OMMA modes, OMMA schemes, OMMA packet distribution modes, etc."). Thus, a POSITA would have recognized that the request or creation by Chincholi's OMMA layer of associations between recipients and the actual MAC and PHY interfaces would be performed in a manner transparent to higher level layers.</p> <p>EX1002 ¶¶ 106-07.</p>	<p>Chincholi discloses techniques for network terminals and WTRUs to discover one another using active and passive scanning procedures. (EX1005 ¶[0145].) After an authentication procedure, Chincholi discloses that WTRUs may transmit a request to associate with one or more RATs of the network terminal and the network terminal may provide an association response signal accepting or rejecting the request of the WTRU. (EX1005 ¶[0149].) A POSITA would have recognized these scanning procedures disclose the ability of Chincholi's OMMA layer to request or create a first association between a recipient and the first actual MAC and PHY interfaces and a second association between the recipient and the second actual MAC and PHY interfaces. (EX1002 ¶106.)</p> <p>When operating transparently with respect to higher layers, see limitation 1[f], Chincholi's OMMA layer handles the request/response and creation of associations with WTRUs. (EX1005 ¶[0127] "[A]ssociation request/response frames may be updated by the OMMA layer to include OMMA device discovery parameters, for example, such as but not limited to OMMA modes, OMMA schemes, OMMA packet distribution modes, etc."). Thus, a POSITA would have recognized that the request or creation by Chincholi's OMMA layer of associations between recipients and the actual MAC and PHY interfaces would be performed in a manner transparent to higher level layers. (EX1002 ¶107.)</p> <p>Petition at 29-30.</p>

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<p>Grounds for Unpatentability:</p> <p>Claim 1(h)</p>	<p>108. In my opinion, Chincholi/Clegg discloses this limitation. Chincholi discloses that the virtual MAC interface uses feedback information to make bandwidth allocation decisions. Chincholi's OMMA layer receives various feedback information from each RAT. (EX1005 ¶¶[0123], [205].) For example, "the OMMA transmitter may use measurement metrics fed back from each RAT," which include "channel quality metrics and the number of available resources on the medium." (EX1005 ¶[0161].) Amongst the available resources provided as part of the feedback information are the "number of channels" and "channel bandwidth" (i.e., the width of the channel, such as 20/40 MHz in the case of the ISM band). (EX1005 ¶[0161].) Table 2 of Chincholi provides examples of feedback metrics used for evaluation, including "Medium Access Delay," "RSSI," "Frame error rate," "Data rate," "Queuing latency," and "End-to-end delay." (EX1005 Table 2.) As discussed in limitation 1[e], the Feedback Device Classifier (resource monitoring interface) collects information regarding the first and second transceiver resources/requirements over the "A2" interfaces so that this information may be fed back to the OMMA Scheduler.</p>	<p>Chincholi discloses that the virtual MAC interface uses feedback information to make bandwidth allocation decisions. Chincholi's OMMA layer receives various feedback information from each RAT. (EX1005 ¶¶[0123], [205]; EX1002 ¶108.) For example, "the OMMA transmitter may use measurement metrics fed back from each RAT," which include "channel quality metrics and the number of available resources on the medium." (EX1005 ¶[0161].) Amongst the available resources provided as part of the feedback information are the "number of channels" and "channel bandwidth" (i.e., the width of the channel, such as 20/40 MHz in the case of the ISM band). (EX1005 ¶[0161].) Table 2 of Chincholi provides examples of feedback metrics used for evaluation, including "Medium Access Delay," "RSSI," "Frame error rate," "Data rate," "Queuing latency," and "End-to-end delay." (EX1005 Table 2.) As discussed in limitation 1[e], the Feedback Device Classifier (resource monitoring interface) collects information regarding the first and second transceiver resources/requirements over the "A2" interfaces so that this information may be fed back to the OMMA Scheduler.</p>

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	<p>109. Chincholi discloses the OMMA layer allocates bandwidth resources to the transceiver resources based on this feedback information. "[T]he OMMA layer may determine a time duration and a bandwidth requirement for an IP flow." (EX1005 ¶[260].) Specifically, the OMMA layer may request resources on a RAT "based on the time duration and the bandwidth requirement for the first IP packet and the second IP packet of the IP flow." (EX1005 ¶[0260].) "The resources are characterized by the time duration and the bandwidth requirement." (EX1005 ¶[0260].) This functionality may be performed, for example, by a "MAC Resource Reservation module 602" of the OMMA layer, which "determine[s] an amount of time duration and/or spectral fragment/bandwidth required by a packet or a set of packets." (EX1005 ¶[0142].) With knowledge of this total bandwidth requirement, as well as the feedback information indicating the number of channels available on each RAT, the "OMMA layer may intelligently manage data traffic across multiple RATs as a function of the link quality of each RAT." (EX1005 ¶[0194].) Because this bandwidth allocation is based on the bandwidth requirement of the IP flow, the allocation decision <i>partially satisfies the bandwidth requirement of the data stream.</i></p> <p>EX1002 ¶¶ 108-09.</p>	<p>Chincholi discloses the OMMA layer allocates bandwidth resources to the transceiver resources based on this feedback information. (EX1002 ¶109.) "[T]he OMMA layer may determine a time duration and a bandwidth requirement for an IP flow." (EX1005 ¶[260].) Specifically, the OMMA layer may request resources on a RAT "based on the time duration and the bandwidth requirement for the first IP packet and the second IP packet of the IP flow." (EX1005 ¶[0260].) "The resources are characterized by the time duration and the bandwidth requirement." (EX1005 ¶[0260].) This functionality may be performed, for example, by a "MAC Resource Reservation module 602" of the OMMA layer, which "determine[s] an amount of time duration and/or spectral fragment/bandwidth required by a packet or a set of packets." (EX1005 ¶[0142].) With knowledge of this total bandwidth requirement, as well as the feedback information indicating the number of channels available on each RAT, the "OMMA layer may intelligently manage data traffic across multiple RATs as a function of the link quality of each RAT." (EX1005 ¶[0194].) Because this bandwidth allocation is based on the bandwidth requirement of the IP flow, the allocation decision <i>partially satisfies the bandwidth requirement of the data stream.</i></p> <p>Petition at 30-32.</p>