

Table 1: Comparing Select Sections of Almeroth Declaration to Corresponding Sections of Petition

Section/Topic	Almeroth Declaration (EX1002)	Petition re: '933 Patent
Grounds for Unpatentability: Overview and Motion to Combine	VI. Ground 1: Chincholi in Combination With Riggert And Clegg Renders Claims 1-30 Obvious² A. Overview and Motivation to Combine 68. In my opinion, Chincholi in combination with Riggert and Clegg renders claims 1-30 obvious. As discussed in more detail below, Chincholi teaches the same architecture as the '933 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 at [0122-0123].) EX1002 ¶ 68 (identical image omitted).	VII. GROUND 1: Chincholi in Combination With Riggert And Clegg Renders Claims 1-30 Obvious¹ A. Overview and Motivation to Combine Chincholi in combination with Riggert and Clegg renders claims 1-30 obvious. (EX1002 ¶¶68-76.) As discussed in more detail below, Chincholi teaches the same architecture as the '933 patent, including a wireless networking device with multiple transceivers, each having actual MAC and PHY interfaces. (<i>Id.</i>) 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].) Petition at 10 (identical image omitted).
	69. Chincholi expressly discloses receiving, at the OMMA layer, feedback information regarding bandwidth availability on a per-transceiver basis and feeding that information back to the OMMA layer's virtual MAC function. (EX1005 at [0137].) Because Chincholi already discloses a partial virtualization of the MAC function at the OMMA layer, a POSITA would have been motivated leverage this virtualization at the OMMA/transceiver interfaces to further increase flexibility in the system. Specifically, in my opinion, rather than implement static (and limited) interfaces between Chincholi's OMMA layer and each RA—i.e., each network protocol stack and associated transceiver—a POSITA would have recognized the opportunity to implement "virtual PHY" interfaces. By 2013, virtualization was a well-understood and widely used tool in computing. A POSITA would have recognized that applying virtualization at the OMMA/transceiver interface—by adding one or more virtual PHY interfaces—would have been a straightforward extension of Chincholi's basic architecture and system design.	Chincholi expressly discloses receiving, at the OMMA layer, feedback information regarding bandwidth availability on a per-transceiver basis and feeding that information back to the OMMA layer's virtual MAC function. (EX1002 ¶69; EX1005 [0137].) Because Chincholi already discloses a partial virtualization of the MAC function at the OMMA layer, a POSITA would have been motivated leverage this virtualization at the OMMA/transceiver interfaces to further increase flexibility in the system. (EX1002 ¶69.) Specifically, rather than implement static (and limited) interfaces between Chincholi's OMMA layer and each RAT, a POSITA would have recognized the opportunity to implement "virtual PHY" interfaces. Petition at 11-12.

Comparison of Almeroth Decl. (Ex. 1002) vs. Petition
Identical, Minor Changes, Paraphrased

Samsung v. XiFi (IPR2025-01207)
Patent Owner XiFi's Exhibit 2006, Page 2

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	EX1002 ¶ 69. 70. Providing a “virtualized” PHY interface between the OMMA layer and the RATs in Chincholi would have been particularly beneficial in implementing an 802.11-based system. This is because implementing virtualized PHY interfaces would allow the system to accommodate communication channels with wireless devices that may operate using various different generations of the 802.11 standards. (EX1005 at [0134] (teaching that “[a] Wi-Fi RAT may be a IEEE802.11n RAT, a IEEE802.11ac RAT, a IEEE802.11af RAT, etc.”).) Virtualization of the physical interface for this purpose is taught, for example, in background reference U.S. Patent Application 2009/0141691 (“Jain”). (See EX1007 at [0034-0037]). A POSITA would have recognized that virtualizing the interfaces between Chincholi’s OMMA layer and individual RATs would result in a flexible and “reconfigurable” PHY interface that could be used to match the different needs of potential recipient devices and networks. (EX1007 (Jain) at [0033]). 71. A POSITA would have understood that one way of implementing virtualized PHY interfaces to further enhance Chincholi is taught in Riggert. Riggert teaches a “bondable virtual interface” which provides a virtualized, flexible interface to the actual PHY interfaces that can be used generically and thus easily substituted across differently configured PHY interfaces in the system. (EX1006 at [0065].) EX1002 ¶¶ 70-71 (identical figure omitted).	“Virtual” PHY interface between the OMMA layer and the RATs in Chincholi would have been particularly beneficial in implementing an 802.11-based system. This is because virtual PHY interfaces would have allowed the system to accommodate communication channels with wireless devices that operate using different generations of the 802.11 standards. (EX1002 ¶70; EX1005 [0134] (teaching that “[a] Wi-Fi RAT may be a IEEE802.11n RAT, a IEEE802.11ac RAT, a IEEE802.11af RAT, etc.”).) Virtualization of the physical interface for this purpose is taught, for example, in background reference U.S. Patent Application 2009/0141691 (“Jain”). (See EX1007 [0034-0037]); EX1002 ¶70.) A POSITA would have recognized that virtualizing the interfaces between Chincholi’s OMMA layer and individual RATs would result in a flexible and “reconfigurable” PHY interface that could be used to match the different needs of recipient devices and networks. (EX1002 ¶70; EX1007 (Jain) [0033]). A POSITA would have understood that one way of implementing virtualized PHY interfaces to further enhance Chincholi is taught in Riggert. (EX1002 ¶71.) Riggert’s “bondable virtual interface” provides a virtualized, flexible interface to the actual PHY interfaces that can be used generically and thus easily substituted across differently configured PHY interfaces in the system. (EX1006 [0065].) Petition at 12 (identical figure omitted).

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	72. A POSITA would have been motivated to modify Chincholi according to the teachings of Riggert's "virtual PHY" to improve the system of Chincholi. The references both arise in the same field of endeavor and are similarly addressed to increasing bandwidth efficiency and throughput in multi-transceiver, wireless communication networks. (EX1005 at [0002] ("Wireless technologies have been demanding higher data throughput rates and lower latencies"); EX1006 at [0004] ("In the field of data streaming in a network, there is a problem in that data streaming from a sending endpoint to a recipient endpoint may be detrimentally affected by limited network bandwidth . . .").) Both references address 802.11 type systems specifically. (See, e.g., EX1005 at [0138]; EX1006 at [0057].) Riggert's "bondable virtual interface" would improve the system of Chincholi by providing a flexible, universal interface between the OMMA layer and the actual transceiver resources. (EX1006 at [0065] ("The bondable virtual interfaces 236 and 336 conform to an interface, which allows them to be used generically in the framework.")). The combined system would improve Chincholi by allowing the OMMA controller to interface with configurable sets of potentially differently configured RATs, a benefit that cannot be achieved alone by Chincholi's system. This combination would allow Chincholi's system to operate seamlessly with a wider variety of recipient devices, potentially operating on different versions of the 802.11 standards. EX1002 ¶ 72.	A POSITA would have been motivated to modify Chincholi according to the teachings of Riggert's "virtual PHY" to improve the system of Chincholi. (EX1002 ¶72.) The references arise in the same field of endeavor and are similarly addressed to increasing bandwidth efficiency and throughput in multi-transceiver, wireless communication networks. (EX1005 [0002] ("Wireless technologies have been demanding higher data throughput rates and lower latencies"); EX1006 at [0004] ("In the field of data streaming in a network, there is a problem in that data streaming from a sending endpoint to a recipient endpoint may be detrimentally affected by limited network bandwidth...").) Both specifically address 802.11 type systems. (See, e.g., EX1005 [0138]; EX1006 [0057].) Riggert's "bondable virtual interface" improved the system of Chincholi by providing a flexible, universal interface between the OMMA layer and the actual transceiver resources. (EX1002 ¶72; EX1006 [0065] ("The bondable virtual interfaces 236 and 336 conform to an interface, which allows them to be used generically in the framework.")). The combined system improved Chincholi by providing a universal interface between the OMMA controller and sets of potentially differently configured RATs, a benefit that cannot be achieved alone by Chincholi's system. (EX1002 ¶72.) This combination allowed Chincholi's system to operate seamlessly with a wider variety of recipient devices operating on different 802.11 standards. (<i>Id.</i>) Petition at 13-14.

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	73. In my opinion, implementing Riggert's virtualized PHY interfaces into Chincholi would have been straight-forward, requiring no more than the exercise of ordinary skill in the art, given that Chincholi already contemplates a virtualization of the MAC function at the OMMA layer. A POSITA would have been well aware of virtualization as a general technique in computing by 2013 and, given the guidance provided by Riggert in combination with the architecture of Chincholi, would have understood how to implement virtualized PHY interfaces to extend Chincholi's basic architecture and system. In my opinion, based on the above, a POSITA would have recognized that the combination could be accomplished with a reasonable expectation of success. 74. In addition, 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. (See also EX1005 ¶¶0155, 0196.) In my opinion, a POSITA would have understood 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, which allows any given channel the ability to use the full channel bandwidth that is not unavailable for communication. Like Chincholi and Riggert, Clegg arises in the field 802.11 wireless communication networks and is addressed to increasing bandwidth efficiency. (EX1009 1:25-37.) EX1002 ¶¶ 73-74.	Implementing Riggert's virtualized PHY interfaces into Chincholi would have been straight-forward, requiring no more than the exercise of ordinary skill in the art, given that Chincholi already contemplates a virtualization of the MAC function at the OMMA layer. (EX1002 ¶73.) A POSITA would have recognized that the combination could be accomplished with a reasonable expectation of success. (<i>Id.</i>) Also, Chincholi teaches continuous monitoring of the "number of available resources on the medium" and distributing IP packets across the RATs accordingly. (EX1005 [0161].) Chincholi's approach enables the system to respond to bandwidth channels, or portions of channels, becoming unavailable during transmission of a data stream. (EX1002 ¶74.) A POSITA would have understood this approach could be further enhanced by Clegg. (EX1002 ¶74.) Clegg teaches techniques for addressing carrier-specific interference within bandwidth channels, which allows any given channel the ability to use the full channel bandwidth that is not unavailable for communication. Like Chincholi and Riggert, Clegg arises in the field 802.11 wireless communication networks and is addressed to increasing bandwidth efficiency. (EX1009 1:25-37.) Petition at 14-15.

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	75. In my opinion, a POSITA would have been motivated to incorporate the teachings of Clegg to improve the Chincholi/Riggert method to more flexibly and efficiently utilize available bandwidth channels 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. In my opinion, the teachings of Clegg are complimentary to Chincholi, and a POSITA would have recognized Clegg's teachings could be implemented into Chincholi without technical challenge. The combined systems and methods would improve Chincholi/Riggert by allowing for any given channel full usage of the channel bandwidth is not unavailable for communication, a benefit cannot be achieved alone by Chincholi/Riggert. This combination would allow the resulting systems and methods to operate seamlessly with a wider variety of recipient devices operating on different versions of the 802.11 standards. EX1002 ¶ 75.	A POSITA would have been motivated to incorporate Clegg to improve Chincholi/Riggert by allowing it to more flexibly and efficiently utilize available channels that may experience carrier-specific interference. (EX1002 ¶75.) Chincholi teaches dynamic allocation of contiguous or non-contiguous channels, and Clegg provides additional detail on how to mitigate carrier-specific interference within any given channel. (EX1002 ¶75.) Clegg compliments Chincholi, and a POSITA would have recognized Clegg's teachings could be implemented into Chincholi without technical challenge. (EX1002 ¶75.) The combined system and methods improve Chincholi/Riggert by allowing, for any given channel, full usage of the channel bandwidth that is not unavailable for communication, a benefit not achieved alone by Chincholi/Riggert. The combination (Chincholi/Riggert/Clegg) allows the resulting systems and methods to operate seamlessly with a wider variety of recipient devices operating on different versions of the 802.11 standards. (EX1002 ¶75.) Petition at 15.

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Grounds for Unpatentability: Preamble	B. Limitation-By-Limitation Analysis 1. Claim 1 a) <i>1[pre]: A method of improving the performance of circuitry, comprising the steps of:</i> 77. In my opinion, and to the extent limiting, Chincholi/Riggert/Clegg discloses the preamble of claim 1. Chincholi discloses a method of improving the performance of circuitry by “manag[ing] multiple radio access technology (RAT) interfaces” and “enabl[ing] opportunistic RAT selection and aggregation for <i>sending data traffic</i> over the RAT interfaces.” (EX1005 at [0003].) “In multi-RAT systems <i>reception and/or transmission</i> 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 at [0002].) 78. Chincholi’s use of “multiple RATs simultaneously may provide <i>increased bandwidth and/or increased reliability</i> for an application. For example, a system comprising an OMMA layer may intelligently <i>manage data traffic</i> across multiple RATs for <i>improved performance</i>.” (EX1005 at [0194].) In my opinion, a POSITA would have understood that Chincholi’s disclosure for improving the bandwidth, reliability, and performance of data is a <i>method of improving the performance of circuitry</i>. Thus, as I discuss in the below limitations, Chincholi/Riggert/Clegg discloses a method of improving the performance of circuitry. EX1002 ¶¶ 77-78.	B. Limitation-By-Limitation Analysis 1. Claim 1 a) 1[pre]: A method of improving the performance of circuitry, comprising the steps of: 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 ¶77.) “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].) Chincholi’s use of “multiple RATs simultaneously may provide <i>increased bandwidth and/or increased reliability</i> for an application. For example, a system comprising an OMMA layer may intelligently manage data traffic across multiple RATs for <i>improved performance</i>.” (EX1005 [0194].) A POSITA would have understood Chincholi’s disclosure for improving the bandwidth, reliability, and performance of data is a <i>method of improving the performance of circuitry</i>. (EX1002 ¶78.) Thus, as discussed in the below limitations, Chincholi/Riggert/Clegg discloses a method for improving the performance of circuitry. Petition at 16.

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Grounds for Unpatentability: Claim 1(a)	b) 1[a]: providing a processing interface that is adapted to be connected to an application interface of a wireless networking device, the application interface being associated with a first application, the first application providing, after the circuitry has been connected to the application interface and when the wireless networking device is being used, a first data stream and having a first wireless bandwidth requirement; 79. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 80. “application interface being associated with a first application ... providing, after the circuitry has been connected to the application interface and when the wireless networking device is being used, a first data stream”: 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 at [0191].) The first data stream of a first application is referred to as an “IP flow.” (EX1005 at [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. first data stream</i>) is provided by the application after the circuitry has been connected to the application interface when the wireless networking device is being used. (EX1005 at [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 application interface being associated with a first application. 81. In my opinion, a POSITA would have understood that Chincholi’s “S” interface for Incoming/Outgoing IP Packets (<i>i.e., application interface</i>) cannot transmit or receive data without the circuitry ha[ving] been connected to the application interface. EX1002 ¶¶ 79-81 (identical figure omitted).	b) 1[a]: providing a processing interface that is adapted to be connected to an application interface of a wireless networking device, the application interface being associated with a first application, the first application providing, after the circuitry has been connected to the application interface and when the wireless networking device is being used, a first data stream and having a first wireless bandwidth requirement; “application interface being associated with a first application... providing, after the circuitry has been connected to the application interface and when the wireless networking device is being used, a first data stream”: Chincholi discloses “[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 ¶¶ 79-80.) 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. first data stream</i>) is provided by the application after the circuitry has been connected to the application interface when the wireless networking device is being used. (EX1005 [0138], Table 1 (“S” interface is for “Incoming/Outgoing IP Packets”).) The interface from the IP layer for the IP stream “[S]” is therefore an application interface being associated with a first application. A POSITA would have understood Chincholi’s “S” interface for Incoming/Outgoing IP Packets (<i>i.e., application interface</i>) cannot transmit or receive data without the circuitry ha[ving] been connected to the application interface. (EX1002 ¶81.) Petition at 17-18 (identical figure omitted).

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	82. <i>“a processing interface that is adapted to be connected to an application interface of a wireless networking device”</i>: Chincholi further discloses that a “processing interface” that is connected to its “application interface.” Chincholi’s <i>processing interface</i> is referred an <i>“Opportunistic Multiple-Medium Access Control (MAC) Aggregation (OMMA) layer.”</i> (EX1005 at [0003].) The OMMA layer is a common layer/module between the IP layer/module and the multiple RAT layers/modules. (EX1005 at [0137]; <i>see also id.</i> at [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.”).) A POSITA would have understood that the plain meanings of “interface” and “layer” in the context of the '933 patent are congruent, which is underscored by the specification describing layers having the same functionality as the claimed interfaces, and the prosecution history of the prior related '591 patent, where Applicant interchangeably used the terms “layer” and “interface” to describe Figure 1. (EX1017, Aug. 8, 2023 Response to Non-Final Office Action (“Figure 1 of the 10/30/2013 '216 provisional shows a wireless networking device in a ‘layer’ format. It includes an ‘application interface’ with four applications A-D...Figure 1 also shows a process layer that forms an example of the claimed ‘processing interface’...Figure 1 also shows four individual actual MAC layers connected to the processing interface...Figure 1 also shows a single actual PHY layer connected to each one of the actual MAC layers.”).) Similarly, in its Sept. 28, 2023 Claim Amendments, Applicant replaced the term “virtual PHY layers” with “virtual PHY interface.” (<i>Id.</i>, Sept. 28, 2023 Claim Amendments) EX1002 ¶ 82 (identical figure omitted).	<i>“a processing interface that is adapted to be connected to application interface of a wireless networking device”</i>: Chincholi discloses a “processing interface” that is connected to its “application interface.” Chincholi’s <i>processing interface</i> is its <i>“Opportunistic Multiple-Medium Access Control (MAC) Aggregation (OMMA) layer.”</i> (EX1005 [0003].) This is a common layer/module between the IP layer/module and the multiple RAT layers/modules. (EX1005 [0137]; [0120].) A POSITA would have understood that the plain meanings of “interface” and “layer” in the context of the '933 patent are congruent, as underscored by the specification describing layers having the same functionality as the claimed interfaces and by the prosecution history of the prior related '591 patent, where Applicant interchangeably used the terms to describe Figure 1. (EX1002 ¶82; EX1017, Aug. 8, 2023 Response to Non-Final Office Action.) Petition at 18-19 (identical figure omitted).

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	83. An exemplary OMMA layer enabling a dual-RAT aggregation device in a 802.11n network is shown in Figure 5: 84. The IP layer is connected to the OMMA layer and provides IP packets that the OMMA layer processes. (EX1005 at [0137]). The OMMA “may allow for enhanced throughput and reduced latency for a single IP flow.” (EX1005 at [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.e., a <i>processing interface</i>. EX1002 ¶¶ 83-84 (identical figure omitted). 86. “first application ... having a first wireless bandwidth requirement”: Chincholi teaches “a bandwidth requirement for an IP flow.” (EX1005 at [260].) EX1002 ¶ 86.	Figure 5 shows an OMMA layer enabling a dual-RAT aggregation device in a 802.11n network: The IP layer is connected to the OMMA layer and provides IP packets the OMMA layer processes. (EX1005 [0137]; EX1002 ¶¶83-85.) 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.e., a <i>processing interface</i>. Petition at 19-20 (identical figure omitted). “first application ... having a first wireless bandwidth requirement”: Chincholi teaches “a bandwidth requirement for an IP flow.” (EX1005 [260]; Petition at 20.
Grounds for Unpatentability: Claim 1(b)	c) 1[b]: connecting first and second actual MAC interfaces to the processing interface: 87. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 88. Chincholi discloses connecting first and second <i>actual MAC interfaces</i> to the processing interface (i.e., 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 at [0138] (“The RATs 501a, 501b may comprise a MAC layer/module 502 and one or more physical layers/modules 503.”).) EX1002 ¶¶ 87-88 (identical figure omitted).	c) 1[b]: connecting first and second actual MAC interfaces to the processing interface: Chincholi discloses connecting first and second <i>actual MAC interfaces</i> to the processing interface (i.e., the OMMA layer). (EX1002 ¶¶87-88.) Figure 5 depicts a “dual-RAT aggregation” with the common OMMA layer above and connected to two RATs 501a and 501b, which respectively comprise first and second actual interfaces 502. (EX1005 [0138] (“The RATs 501a, 501b may comprise a MAC layer/module 502 and one or more physical layers/modules 503.”).) Petition at 21 (identical figure omitted).

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Grounds for Unpatentability: Claim 1(c)	d) 1[c]: connecting first and second actual PHY interfaces respectively to the first and second actual MAC interfaces: 89. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 90. Each RAT in Chincholi comprises <i>one or more physical layers</i>. (EX1005 at [0138] (“The RATs 501a, 501b may comprise a MAC layer/module 502 and <i>one or more physical layers/modules 503</i>.”).) Chincholi discloses connecting the actual PHY layers are respectively to the actual MAC interfaces: EX1002 ¶¶ 89-90 (identical figure omitted).	d) 1[c]: connecting first and second actual PHY interfaces respectively to the first and second actual MAC interfaces: Each RAT 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 ¶¶ 89-90.) Chincholi discloses connecting the actual PHY layers to the actual MAC interfaces: Petition at 21 (identical figure omitted).
Grounds for Unpatentability: Claim 1(d)	e) 1[d]: respectively associating first and second wireless transceivers with the first and second actual PHY interfaces, wherein each of the first and second wireless transceivers is suitable for use in a wireless local area network, and the first and second wireless transceivers, respectively, (i) have a first and second bandwidth availability up to a first and second actual bandwidths, and (ii) are adapted to emit radio waves in first and second different bands of frequencies; 91. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 92. “respectively associating first and second wireless transceivers with the first and second actual PHY interfaces ... suitable for use in a wireless local area network”: Chincholi Figure 5 illustrates associating each actual PHY interface of each RAT with an <i>antenna/radio frequency (RF) front-end pair</i>. (EX1005 at [0133].)	e) 1[d]: respectively associating first and second wireless transceivers with the first and second actual PHY interfaces, wherein each of the first and second wireless transceivers is suitable for use in a wireless local area network, and the first and second wireless transceivers, respectively, (i) have a first and second bandwidth availability up to a first and second actual bandwidths, and (ii) are adapted to emit radio waves in first and second different bands of frequencies; “respectively associating first and second wireless transceivers with the first and second actual PHY interfaces... suitable for use in a wireless local area network”: Chincholi Figure 5 associates each actual PHY interface of each RAT with an <i>antenna/radio frequency (RF) front-end pair</i>. (EX1005 [0133]; EX1002 ¶¶ 91-92.) The <i>antenna/radio frequency (RF) front-end pairs</i> in Figure 5 includes <i>first and second transceivers</i>.

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	93. The antenna/radio frequency (RF) front-end pairs in Figure 5 include first and second transceivers. In my opinion, 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 at [0134].) In my opinion, a POSITA would have further understood that the transceivers in Figure 5 are associating 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. 94. Chincholi also teaches that each RAT may implemented as a Wi-Fi RAT, and thus their associated transceivers are suitable for use in a wireless local area network. (EX1005 at [0134].) EX1002 ¶¶ 91-94.	A POSITA would have understood a "transceiver" is a physical device that can transmit and receive information. (EX1002 ¶93.) Each of Chincholi's disclosed "antenna/RF front-end pairs" is a transceiver because each operates on wireless protocols that both transmit and receive data, such as IEEE802.11, IEEE802.11ac, IEEE802.11af, LTE, WCDMA, etc. (EX1005 [0134].) A POSITA would have understood the transceivers in Figure 5 are associated with the actual PHY layer of each respective RAT, because the PHY layer is the physical connection between a transceiver and the rest of the RAT. (EX1002 ¶93.) Chincholi teaches each RAT may be a Wi-Fi RAT, and thus their associated transceivers are suitable for use in a wireless local area network. (EX1005 [0134]. EX1002 ¶94.) Petition at 24-25.

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	95. <i>“each one of the first and second wireless transceivers ... has a first and second bandwidth availability up to a first and second actual bandwidth”</i>: The plain meaning of this limitation is that each of the wireless transceivers has at least two bandwidth availabilities and two respective actual bandwidths. However, I understand that the Patent Owner has alleged in the parallel litigation that this limitation may be met by each of the three wireless transceivers having one respective bandwidth availability up to an actual bandwidth. EX1013 at 20-12. 96. <i>Regardless, Chincholi discloses or renders obvious this limitation under either interpretation</i>. 97. In my opinion, a POSITA would have recognized that each transceiver has an “actual” bandwidth with a “bandwidth availability” that may be a subset of the actual bandwidth, as the actual bandwidth refers to the total bandwidth of the transceiver, and the bandwidth availability refers to those subportions 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 at [0138]; [0161] (listing “Channel bandwidth(s)” sent by the PHY layer as an example of “feedback metric[] used by an OMMA layer”); <i>see also id.</i> at [0167] (“At startup, the OMMA layer may receive the <i>available bandwidth of each of the one or more RATs.</i>”).) Thus, Chincholi discloses that each transceiver has at least one bandwidth availability up to an actual bandwidth. EX1002 ¶¶ 95-97.	<i>“each one of the first and second wireless transceivers... has a first and second bandwidth availability up to a first and second actual bandwidth”</i>: The plain meaning of this limitation is that each wireless transceiver has at least two bandwidth availabilities and two actual bandwidths. (EX1002 ¶95.) However, Patent Owner alleges in the parallel litigation that this limitation is met if each of the two wireless transceivers has only one bandwidth availability up to an actual bandwidth. (EX1013 20-21.) Chincholi discloses or renders obvious this limitation under either interpretation. (EX1002 ¶96.) A POSITA would have recognized each transceiver has an “actual” bandwidth (total bandwidth of the transceiver) with a “bandwidth availability” that may be a subset of the actual bandwidth (sub-portions of the total bandwidth are available for use). (EX1002 ¶97.) Chincholi teaches that 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”); [0167] (“At startup, the OMMA layer may receive the <i>available bandwidth of each of the one or more RATs.</i>”).) Thus, Chincholi discloses each of the two transceivers have a bandwidth availability up to an actual bandwidth. Petition at 25-26.

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	98. Chincholi also discloses that there are multiple available bandwidths for each transceiver, specifically that a transceiver's feedback metrics include available "[c]hannel bandwidth(s)" in the form of a "Vector/list of elements which are multiple of 0.5 MHz." EX1005 at [0161], Table 2. In my opinion, a POSITA would have understood a "vector" or "list" data structure is a data structure for transferring multiple data elements of indeterminate count, and would therefore have understood that the number of available "channel bandwidths" stored in the vector could and would exceed two. Indeed, if the number of "channel bandwidths" was limited to one or two available bandwidths, then it would be more efficient to use a more suitable data structure limited to two data elements such as a tuple or ordered pair. EX1002 ¶ 98 99. "each one of the first and second wireless transceivers ... is adapted to emit radio waves in first and second different bands of frequencies": The plain meaning of this limitation is that each of the three transceivers emit radio waves in both frequency bands. I understand that Patent Owner, however, has read this limitation to only require that each transceiver emit on a single frequency band. For example, in its infringement contentions, Patent Owner alleges that this limitation is met by implementation of the Wi-Fi 7 Draft Standard where "[t]he first transceiver is the 2.4 GHz transceiver," the second is "one of the 5 GHz and 6 GHz transceivers" and the third is "the other one of the 5 GHz and 6 GHz transceivers." EX1013 at 20-21. Regardless, Chincholi discloses or renders obvious this limitation under either interpretation. EX1002 ¶ 99.	Chincholi also discloses multiple available bandwidths for each transceiver. A transceiver's feedback metrics include available "[c]hannel bandwidth(s)" in the form of a "Vector/list of elements which are multiple of 0.5 MHz." (EX1005 [0161], Table 2.) A POSITA would have understood a "vector" or "list" is a data structure for transferring multiple data elements of indeterminate count, and would therefore have understood the number of available "channel bandwidths" stored in it could and would exceed two. (EX1002 ¶98.) Petition at 26. "each of the first and second wireless transceivers... is adapted to emit radio waves in first and second different band of frequencies": The plain meaning of this limitation is each transceiver emits radio waves in two frequency bands. Patent Owner has read this limitation to require each transceiver emit on a single frequency band, different from that used by the other. (EX1013 20-21; EX1002 ¶99.) Chincholi discloses or renders obvious this limitation under either interpretation. Petition at 26.

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	100. The transceivers of each RAT are adapted to emit radio waves in first and second different bands of frequencies. In the context of Figure 4, Chincholi discloses that “[f]or multiple RATs 401, <i>each RAT 401 may be operating on a specific band</i>. 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 (<i>e.g.</i>, 700 MHz band), a Bluetooth RAT operating on 2.4 GHz ISM band, <i>etc.</i>” (EX1005 at [0135]). Thus, a POSITA would have understood that Chincholi discloses this limitation under PO’s interpretation. EX1002 ¶ 100. 101. Chincholi also discloses that each transceiver can emit radio waves within the same at least two frequency bands. For example, Chincholi describes that an NT and WTRU “may communicate with each other over a single radio frequency (RF) spectral band” such as “2.4 GHz ISM band, <i>or</i> 5 GHz ISM band,” even when the devices are “multi-RAT capable devices,” <i>i.e.</i> comprising multiple transceivers. EX1005 at [0118]. Chincholi further describes that the frequency band is comprised of “multiple contiguous or noncontiguous channels” within the band over which the devices communicate. <i>Id.</i> Accordingly, in my opinion, a POSITA would have understood that, for example, each transceiver operating on the 2.4 GHz ISM band comprises of at least the same two contiguous and noncontiguous channels, <i>i.e.</i> the <i>first and second different bands of frequencies</i>. EX1002 ¶ 101.	The transceivers of each RAT are adapted to emit radio waves in respective different bands of frequencies, consistent with PO’s infringement contentions. In the context of Figure 4, Chincholi discloses “[f]or multiple RATs 401, <i>each RAT 401 may be operating on a specific band</i>. 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 (<i>e.g.</i>, 700 MHz band), a Bluetooth RAT operating on 2.4 GHz ISM band, <i>etc.</i>” (EX1005 [0135]). Thus, a POSITA would have understood Chincholi discloses this limitation under PO’s interpretation. (EX1002 ¶100.) Petition at 26-27. Chincholi discloses each transceiver can emit radio waves within the same at least two frequency bands. For example, Chincholi describes that an NT and WTRU “may communicate with each other over a single radio frequency (RF) spectral band” such as “2.4 GHz ISM band, <i>or</i> 5 GHz ISM band,” even when the devices are “multi-RAT capable devices,” <i>i.e.</i> comprising multiple transceivers. (EX1005 [0118].) Chincholi further describes the frequency band is comprised of “multiple contiguous or noncontiguous channels” within the band over which the devices communicate. <i>Id.</i> Accordingly, a POSITA have understood each transceiver operating on the 2.4 GHz ISM band is adapted to emit radio waves in any one of two contiguous channels, <i>i.e.</i> the <i>first and second different bands of frequencies</i>. (EX1002 ¶101.) Petition at 27.

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Grounds for Unpatentability: Claim 1(e)	¶ 1[e]: forming in the processing interface (i) at least one virtual MAC interface and (ii) first and second virtual PHY interfaces that, after the circuitry has been connected to the application interface and during operation of the wireless networking device, feed information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface; 102. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 103. According to the '933 patent, the claimed virtual MAC and PHY layers "enable simultaneous allocation of multiple PHY resources for different signal types associated with different applications." (EX1001 at 3:52-54.) The patent states that the virtual MAC layer comprises the functionality of "decision," "processing," and "ultra-streaming" blocks, while the virtual PHY layer may comprise one or more "RF blocks." (EX1001 at 4:49-52.) The virtual PHY layer may include multiple RF blocks, each representing the virtual use of some set of allocated transceiver resources. (EX1001 at 4:52-54; 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.) EX1002 ¶¶ 102-03.	¶ 1[e]: forming in the processing interface (i) at least one virtual MAC interface and (ii) first and second virtual PHY interfaces that, after the circuitry has been connected to the application interface and during operation of the wireless networking device, feed information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface; According to the '933 patent, the claimed virtual MAC and PHY layers "enable simultaneous allocation of multiple PHY resources for different signal types associated with different applications." (EX1001 3:52-54.) The virtual MAC layer comprises the functionality of "decision," "processing," and "ultra-streaming" blocks, while the virtual PHY layer may comprise one or more "RF blocks." (EX1001 4:49-52; EX1002 ¶¶ 102-103.) The virtual PHY layer may include multiple RF blocks, each representing the virtual use of some set of allocated transceiver resources. (EX1001 4:52-54; 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 6:4-8.) Petition at 27-28.

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	104. <i>First</i>, Chincholi discloses that the OMMA (i.e., the processing interface) includes the claimed “virtual MAC interface.” 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 at [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 at [0120].) In my opinion, 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. 105. Chincholi’s OMMA layer also includes all of the functionality that the '933 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 at [0139].) EX1002 ¶¶ 104-05 (identical figure omitted). 106. The IP QoS Scheduler classifies incoming packets of a packet stream, and may segregate them into distinct IP QoS streams (EX1005 at [0143]), which, in my opinion, a POSITA would have recognized to fulfill the functionality of the “decision block” of the '933 patent’s “virtual MAC interface” (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 at [0142]), which, in my opinion, a POSITA would have recognized to fulfill the functionality	<i>First</i>, Chincholi discloses the OMMA (i.e., the processing interface) includes the claimed “virtual MAC interface.” “OMMA” is an abbreviation for “opportunistic multi-medium access control (MAC) aggregation,” referring to the OMMA layer aggregating 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 [0120].) A POSITA would have recognized 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 ¶104.) Chincholi’s OMMA layer also includes all of the functionality the patent associates with the “virtual MAC interface.” 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].) Petition at 28-29 (identical figure omitted). 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

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	of the “processing block” of the '933 patent’s “virtual MAC interface” (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 at [0139]), which in my opinion, a POSITA would have recognized to fulfill the functionality of the “ultra-streaming block” of the '933 patent’s “virtual MAC interface” (EX1001 at 3:36-40). Thus, in my opinion, a POSITA would have recognized that Chincholi’s OMMA layer includes a “virtual MAC interface.” EX1002 ¶ 106.	would have recognized as the functionality of the “decision block” of the patent’s “virtual MAC interface” (EX1002 ¶106; EX1001 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 as the functionality of the “processing block” of the patent’s “virtual MAC interface” (EX1002 ¶106; EX1001 3:34-36). 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 as the functionality of the “ultra-streaming block” of the patent’s “virtual MAC interface” (EX1002 ¶106; EX1001 3:36-40). Thus, a POSITA would have recognized Chincholi’s OMMA layer includes a “virtual MAC interface.” (EX1002 ¶106.) Petition at 29-30.
	107. <i>Second</i>, Chincholi discloses that its processing interface comprises the “forming in the processing interface...first and second virtual PHY interfaces” to feed information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface. Chincholi discloses that the traffic shaping module of the OMMA (<i>i.e.</i>, part of the “virtual MAC interface”) may determine packet routing using “feedback based routing.” (EX1005 at [0139].) In feedback based routing, “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 at [0161].)	<i>Second</i>, Chincholi discloses its processing interface comprises the “forming in the processing interface...first and second virtual PHY interfaces” to feed information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface. (EX1002 ¶107.) Chincholi discloses the traffic shaping module of the OMMA (<i>i.e.</i>, 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

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	108. 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 (<i>e.g., each RAT</i>) may provide feedback metrics (<i>e.g., a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC</i>) to the OMMA Controller 2900 <i>per device (e.g., WTRU or NT) per access category supported at that RAT.</i>” (EX1005 at [0205].) In my opinion, it would have been obvious to a POSITA to incorporate first and second virtual PHY interfaces into the OMMA Controller of Chincholi to collect the disclosed feedback metrics from the RATs over the “A2” interface and feed it back to the virtual MAC interface. EX1002 ¶¶ 107-08 (identical figure omitted).	metrics and the <i>number of available resources on the medium.</i>” (EX1005 [0161].) 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 (<i>e.g., each RAT</i>) may provide feedback metrics (<i>e.g., a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC</i>) to the OMMA Controller 2900 <i>per device (e.g., WTRU or NT) per access category supported at that RAT.</i>” (EX1005 [0205].) It would have been obvious to a POSITA to incorporate first and second virtual PHY interfaces into the OMMA Controller of Chincholi to collect the disclosed feedback metrics from the RATs over the “A2” interface and feed it back to the virtual MAC interface. (EX1002 ¶108.) Petition at 30-31 (identical figure omitted).
	109. Further details regarding the implementation of virtual PHY interfaces is disclosed by Riggert. As discussed above, <i>supra</i> Section IV, Riggert teaches a “bondable virtual interface” that provides one or more virtualized physical interfaces to the actual PHY layers of the communication channels, allowing for easy substitution of the interface throughout the system. (EX1006 at [0065].) Providing this sort of virtualized physical interface for transceivers in an 802.11 system is particularly beneficial as it allows an access point to accommodate communication channels with wireless devices that may operate using various different generations	Further details regarding the implementation of virtual PHY interfaces is disclosed by Riggert. (EX1002 ¶109.) As discussed above, <i>supra</i> Section IV.B.2, Riggert teaches a “bondable virtual interface” that provides one or more virtualized physical interfaces to the actual PHY layers of the communication channels, allowing for easy substitution of the interface throughout the system. (EX1006 [0065].) Providing this sort of virtualized physical interface for transceivers in an 802.11 system is particularly beneficial as it allows an access point to accommodate communication channels with wireless devices that may operate using various

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	of the 802.11 standards. Virtualization of the physical interface for this purpose is taught, for example, in background reference U.S. Patent Application 2009/0141691 ("Jain"). (See EX1009 at [0034-0037]). 110. Figure 5 teaches the basic architecture for implementing "bondable virtual interfaces" in the wireless network devices of a multi-channel network: 111. The "bondable virtual interface" in Figure 5 on the server side is denoted as a "bondable PHY" (240). While the exemplary architecture depicts only a single "bondable virtual interface" associated with four actual transceiver resources, Riggert teaches that <i>multiple</i> physical bondable interfaces are possible in a single device. For example, each network endpoint may comprise a "plurality of bondable virtual interface connectors 244 and 344, respectively," each one of which may be associated with specific bondable virtual interface. (EX1006 at [0069].) EX1002 ¶¶ 109-111 (identical figure omitted).	different generations of the 802.11 standards. (EX1002 ¶112.) Virtualization of the physical interface for this purpose is taught, for example, in background reference U.S. Patent Application 2009/0141691 ("Jain"). (See EX1007 [0034-0037]); (EX1002 112). Figure 5 teaches the basic architecture for implementing "bondable virtual interfaces" in the wireless network devices of a multi-channel network: The "bondable virtual interface" in Figure 5 on the server side is denoted as a "bondable PHY" (240). (EX1002 ¶¶110-111.) While the exemplary architecture depicts only a single "bondable virtual interface" associated with four actual transceiver resources, Riggert teaches <i>multiple</i> physical bondable interfaces are possible in a single device. For example, each network endpoint may comprise a "plurality of bondable virtual interface connectors 244 and 344, respectively," each one of which may be associated with specific bondable virtual interface. (EX1006 [0069]; EX1002 ¶¶110-111.) Petition at 32-34 (identical figure omitted).
	112. For the reasons discussed above, see Section VI.A, in my opinion, a POSITA would have been motivated to combine Riggert's implementation of virtual PHY interfaces into the OMMA Controller of Chincholi for the purposes of receiving the feedback statistics over the "A2" interfaces and passing that feedback data to Chincholi's traffic shaping module. The resulting combination would implement one or more bondable virtual PHY interfaces into Chincholi's OMMA controller, each associated with one or more actual MAC-PHY pairs, thus increasing flexibility in the system. EX1002 ¶ 112.	For the reasons discussed above, see Section VII.A, a POSITA would have been motivated to combine Riggert's implementation of virtual PHY interfaces into the OMMA Controller of Chincholi for the purposes of receiving the feedback statistics over the "A2" interfaces and passing that feedback data to Chincholi's traffic shaping module. The resulting combination would implement one or more bondable virtual PHY interfaces into Chincholi's OMMA controller, each associated with one or more actual MAC-PHY pairs, thus increasing flexibility in the system. (EX1002 ¶112.) Petition at 34.

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Grounds for Unpatentability: Claim 1(f)	g) I[f]: wherein the processing interface is configured to, after the circuitry has been connected to the application interface and when the wireless networking device is being used, and in a manner transparent to any layer of the wireless networking device above the processing interface, 113. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 114. Chincholi discloses that its OMMA layer (i.e., processing interface) is configured to operate in a manner transparent to any higher layer. For example, Chincholi discloses that “[t]he OMMA layer <i>may be transparent</i> in that it distributes and/or combines packets from different RATs and forwards the packets to the IP layer.” (EX1005 at [0192], [0126].) This is as opposed to a “non-transparent” configuration in which the OMMA layer would “add[] additional headers [] at the transmitter, and reads and/or removes the headers at the receiver.” (EX1005 at [0192], [0126].) EX1002 ¶¶ 113-14.	g) I[f]: wherein the processing interface is configured to, after the circuitry has been connected to the application interface and when the wireless networking device is being used, and in a manner transparent to any layer of the wireless networking device above the processing interface, Chincholi discloses its OMMA layer (i.e., processing interface) is configured to operate in a manner transparent to any higher layer. (EX1002 ¶¶113-114.) For example, Chincholi discloses “[t]he OMMA layer <i>may be transparent</i> 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 reads and/or removes the headers at the receiver.” (EX1005 [0192], [0126].) Petition at 34-35.

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Grounds for Unpatentability: Claim 1(g)	h) I[g]: (a) request or create (i) a first association between a recipient and the first actual MAC and PHY interfaces and (ii) a second association between the recipient and the second actual MAC and PHY interfaces: 115. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 116. Chincholi discloses techniques for network terminals and WTRUs to discover one another using active and passive scanning procedures. (EX1005 at [0145].) After an authentication procedure, Chincholi discloses that WTRUs may transmit an request to associate with one or more RATs of the network terminal and that the network terminal may provide an association response signal accepting or rejecting the request of the WTRU. (EX1005 at [0149].) In my opinion, a POSITA would have recognized that these scanning procedures disclose the ability of Chincholi's OMMA layer to request or create associations between recipients and first, second, and third actual MAC and PHY interfaces. 117. When operating transparently with respect to higher layers, see limitation [1g], Chincholi's OMMA layer handles the request/response and creation of associations with WTRUs. (EX1005 at [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, in my opinion, a POISTA 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 have been performed in a manner transparent to higher level layers. EX1002 ¶¶ 115-17.	h) I[g]: (a) request or create (i) a first association between a recipient and the first actual MAC and PHY interfaces and (ii) a second association between the recipient and the second actual MAC and PHY interfaces: Chincholi discloses techniques for network terminals and WTRUs to discover one another using active and passive scanning procedures. (EX1005 [0145]; (EX1002 ¶¶115-116.) After an authentication procedure, Chincholi discloses 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 associations between recipients and first, second, and third actual MAC and PHY interfaces. (EX1002 ¶116.) When operating transparently with respect to higher layers, see limitation [1f], 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 POISTA would have recognized 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 ¶117.) Petition at 35-36.

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Grounds for Unpatentability: Claim 1(h)	i) I[h]: (b) identify at least one first portion of the first actual bandwidth of the first wireless transceiver, the identified at least one first portion comprising a set of given resources, 118. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 119. Chincholi teaches that NTs and WTRUs communicate with one another over “channels,” which are portions of a transceiver bandwidth availability. Specifically, “[t]he NT and WTRU may communicate with each other over a single radio frequency (RF) spectral band, for example, 2.4 GHz ISM band, or 5 GHz ISM band, or TVSWS band, or 60 GHz band, using a channel within the band or aggregating multiple contiguous or noncontiguous channels.” (EX1005 at [0118]; <i>see also id.</i> at [0121] (“An 802.11 based system may operate in a time division duplexing (TDD) mode, for example, on a band over a single 20/40MHz channel in the case of ISM band or a single 5/10/20 MHz channel in television white space (TVWS) band using contiguous/non-contiguous carrier aggregation.”).) 120. Chincholi also discloses identifying available bandwidth channels for communication. The OMMA layer receives various feedback information from each RAT. (EX1005 at [0123].) 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 at [0161].) Amongst the available resources provided as part of the feedback information are the “number of channels” and “channel bandwidth” (<i>i.e.</i>, the width of the channel, such as 20/40 MHz in the case of the ISM band). (EX1005 at [0161].) EX1002 ¶¶ 118-120.	i) I[h]: (b) identify at least one first portion of the first actual bandwidth of the first wireless transceiver, the identified at least one first portion comprising a set of given resources, Chincholi teaches NTs and WTRUs communicate with one another over “channels,” which are portions of a transceiver bandwidth availability. (EX1002 ¶¶ 118-119.) Specifically, “[t]he NT and WTRU may communicate with each other over a single radio frequency (RF) spectral band, for example, 2.4 GHz ISM band, or 5 GHz ISM band, or TVSWS band, or 60 GHz band, using a channel within the band or aggregating multiple contiguous or noncontiguous channels.” (EX1005 [0118]; [0121] (“An 802.11 based system may operate in a time division duplexing (TDD) mode, for example, on a band over a single 20/40MHz channel in the case of ISM band or a single 5/10/20 MHz channel in television white space (TVWS) band using contiguous/non-contiguous carrier aggregation.”).) Chincholi also discloses identifying available bandwidth channels for communication. (EX1002 ¶120.) The OMMA layer receives various feedback information from each RAT. (EX1005 [0123].) 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>i.e.</i>, the width of the channel, such as 20/40 MHz in the case of the ISM band). (EX1005 [0161].) Petition at 36-37.

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	121. In my opinion, a POSITA would have understood that the ability of Chincholi's OMMA layer to receive from each RAT a number of channels and channel bandwidth is an identification of "at least one portion" (i.e., at least one available channel, or an aggregation of multiple contiguous or non-contiguous channels) of the first actual bandwidth of the first wireless transceiver. In my opinion, a POSITA would have further understood that each identified channel bandwidth is comprised of a number of frequency carriers, which are a set of given communication resources for the identified channel. 122. Chincholi further discloses that the OMMA layer evaluates the identified channel availabilities with respect to the first bandwidth requirement of the first application and allocates bandwidth resources accordingly. As Chincholi teaches, "the OMMA layer may determine a time duration and a bandwidth requirement for an IP flow." (EX1005 at [260].) With knowledge of this total bandwidth requirement, as well as the feedback information indicating the number of channels available on each RAT, Chincholi teaches how its "OMMA layer may intelligently manage data traffic across multiple RATs ... as a function of the link quality of each RAT." (EX1005 at [0194].) EX1002 ¶¶ 121-22.	A POSITA would have understood the ability of Chincholi's OMMA layer to receive from each RAT a number of channels and channel bandwidth is an identification of "at least one portion" (i.e., at least one available channel, or an aggregation of multiple contiguous or non-contiguous channels) of the first actual bandwidth of the first wireless transceiver. (EX1002 ¶121.) A POSITA would have further understood each identified channel bandwidth is comprised of a number of frequency carriers, which are a set of given communication resources for the identified channel. (EX1002 ¶121.) Chincholi further discloses the OMMA layer allocates bandwidth resources to the transceiver resources. (EX1002 ¶122.) As Chincholi teaches, "the OMMA layer may determine a time duration and a bandwidth requirement for an IP flow." (EX1005 [260].) With knowledge of this total bandwidth requirement, as well as the feedback information indicating the number of channels available on each RAT, Chincholi teaches how its "OMMA layer may intelligently manage data traffic across multiple RATs ... as a function of the link quality of each RAT." (EX1005 [0194].) Petition at 37.

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	123. Specifically, Chincholi discloses how “[t]he OMMA layer may request resources on a first RAT and on a second 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 at [0260].) “The resources are characterized by the time duration and the bandwidth requirement.” (EX1005 at [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 at [0142].) 124. Chincholi goes on to detail multiple feedback-based OMMA algorithms for allocating IP packets across respective RATs based on their bandwidth availability. (EX1005 at [0162].) For example, in a “cold start” phase, Chincholi teaches how the OMMA layer “may request the individual RATs to transmit the total channel bandwidths supported by them.” (EX1005 at [1063].) Thus, the distribution of IP packets across two separate RATS, operating on two different frequency bands, may be calculated as the simple ratio of available bandwidth on the two RATs: $BW_{ISM} : \sum_{k=1}^N BW_{TVWS}^k$ EX1002 ¶ 123-24.	Specifically, Chincholi discloses how “[t]he OMMA layer may request resources on a first RAT and on a second 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]; EX1002 ¶123.) “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].) Chincholi goes on to detail multiple feedback-based OMMA algorithms for allocating IP packets across respective RATs based on their bandwidth availability. (EX1005 [0162]; EX1002 ¶124.) For example, in a “cold start” phase, Chincholi teaches how the OMMA layer “may request the individual RATs to transmit the total channel bandwidths supported by them.” (EX1005 [1063].) Thus, the distribution of IP packets across two separate RATS, operating on two different frequency bands, may be calculated as the simple ratio of available bandwidth on the two RATs: $BW_{ISM} : \sum_{k=1}^N BW_{TVWS}^k$ Petition at 38.

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	125. (EX1005 at [0163].) Chincholi then discloses more sophisticated algorithms for allocating packets based on <i>both</i> available bandwidth and link quality for each of a “ramp-up phase” and a “steady state phase.” (EX1005 at [0164]-[0165]). 126. Indeed, consistent with the purported technological advance of the '933 patent, Chincholi teaches how the common OMMA layer, situated above the actual MAC interfaces, is uniquely positioned to make a global evaluation of the bandwidth requirement for an IP flow with respect to available transceiver resources. (EX1002 ¶126.) An individual actual MAC, for example, “may be unaware of the resource allocation to the NT and WIRU by other MACs,” and thus permitting multi-RAT resource allocation would “not be globally optimal.” (EX1005 [259].) “Since the OMMA layer may be the common entity which is aware of the link quality metrics on each RAT for a device and QoS class . . . , a globally optimal resource allocation may be performed at the OMMA layer, and the optimal resource allocation may be signaled to the MAC on each RAT.” (EX1005 [259].) EX1002 ¶¶ 125-26.	(EX1005 [0163].) Chincholi then discloses more sophisticated algorithms for allocating packets based on <i>both</i> available bandwidth and link quality for each of a “ramp-up phase” and a “steady state phase.” (EX1005 [0164]-[0165]; EX1002 ¶125). Indeed, consistent with the purported technological advance of the '933 patent, Chincholi teaches how the common OMMA layer, situated above the actual MAC interfaces, is uniquely positioned to make a global evaluation of the bandwidth requirement for an IP flow with respect to available transceiver resources. (EX1002 ¶126.) An individual actual MAC, for example, “may be unaware of the resource allocation to the NT and WIRU by other MACs,” and thus permitting multi-RAT resource allocation would “not be globally optimal.” (EX1005 [259].) “Since the OMMA layer may be the common entity which is aware of the link quality metrics on each RAT for a device and QoS class . . . , a globally optimal resource allocation may be performed at the OMMA layer, and the optimal resource allocation may be signaled to the MAC on each RAT.” (EX1005 [259].) Petition at 38-39.
Grounds for Unpatentability: Claim 1(i)	d) [i]: (c) evaluate whether any of the given resources of the first identified actual bandwidth portion are unavailable for communication, and 127. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 128. It is my opinion that a POSITA would have understood that the plain meaning of resource “unavailable” in the context of the '933 patent broadly includes	d) [i]: (c) evaluate whether any of the given resources of the first identified actual bandwidth portion are unavailable for communication, and A POSITA would have understood that the plain meaning of resource “unavailable” in the context of the '933 patent broadly includes resources that are partially or completely unavailable or that have less bandwidth availability than another resource. (EX1002 ¶¶127-128.) Indeed, during prosecution of the prior related '591 patent, the applicant expressly stated in arguing patentability to overcome a prior art rejection that “[i]t is applicant’s intention that these words [“unavailable” and “unavailability”] refer to, for example, a partial or complete loss

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	resources that are partially or completely unavailable or that have less bandwidth availability than another resource. This is consistent with the applicant's use of the term during prosecution of the prior related '591 patent, where in arguing patentability to overcome a prior art rejection, the applicant expressly stated that "[i]t is applicant's intention that these words ["unavailable" and "unavailability"] refer to, for example, a partial or complete loss of certain transceiver resources as well as a situation where a different band than the one currently in use provides more bandwidth available for transmission." (EX1017, Aug. 8, 2023 Response to Non-Final Office Action ("As an additional matter, the Examiner's attention is drawn to the fact that the word 'unavailable' and 'unavailability' are used in dependent claims 29-31. It is applicant's intention that these words refer to, for example, a partial or complete loss of certain transceiver resources as well as a situation where a different band than the one currently in use provides more bandwidth available for transmission. A replacement transmission resource is found if either of these conditions happen.")) 129. As I discuss above, <i>see</i> limitation 1[h], Chincholi discloses "feedback based routing" wherein the "number of available resources on the medium" of each RAT is monitored and IP packets are distributed across the RATs accordingly. (EX1005 at [0161].) The OMMA layer may, for example, maintain a "RAT capability database" storing the available RAT capability for an associated WTRU/NT (EX1005 at [0233], and "continuously updat[ing]" this information based on feedback metrics. (EX1005 at [235].) In my opinion, a POSITA would have understood Chincholi's ability to use feedback metrics to continuously monitor available resources to disclose the capability to evaluate whether any given resources of the first identified bandwidth portion are unavailable for communication. EX1002 ¶¶ 127-28.	of certain transceiver resources as well as a situation where a different band than the one currently in use provides more bandwidth available for transmission." (See EX1002 ¶128; EX1017 Aug. 8, 2023 Applicant Remarks.) As discussed above, <i>see</i> limitation 1[h], Chincholi discloses "feedback based routing" wherein the "number of available resources on the medium" of each RAT is monitored and IP packets are distributed across the RATs accordingly. (EX1005 [0161].) The OMMA layer may, for example, maintain a "RAT capability database" storing the available RAT capability for an associated WTRU/NT (EX1005 [0233], and "continuously updat[ing]" this information based on feedback metrics. (EX1005 [235].) A POSITA would have understood Chincholi's ability to use feedback metrics to continuously monitor available resources to disclose the capability to evaluate whether any given resources of the first identified bandwidth portion are unavailable for communication. (EX1002 ¶128.) Petition at 39-40.

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	130. In addition, evaluating unavailability of given resources within the first identified bandwidth portion is further taught by Clegg. Clegg teaches a technique for a multi-band 802.11 device to “increase data throughput by aggregating one or more of the available sub-channels for simultaneous use in transmitting and receiving data.” (EX1009 at 1:25-28.) To accomplish this, Clegg teaches the use of an “ultra-wideband tuner to <i>evaluate</i> the entire available spectrum between several communication bands.” (EX1009 at 3:60-63.) Specifically, an 802.11 access point may “search across 1) available bands (e.g., the 2.4 GHz, 5 GHz, and/or 60 GHz bands), and 2) sub-channels within each band, and measure interference on a carrier-by-carrier basis across those bands and sub-channels.” (EX1009 at 4:5-9.) Each carrier is evaluated to determine whether interference is “too high or above a threshold amount.” (EX1009 at 7:16-17.) Clegg can use this information to create a “channel map” identifying the available carriers across entire communication bands or discrete sub-channels “so that a user can select subcarriers from across those bands to form a cluster for communication.” (EX1009 at 7:19-22.) EX1002 ¶ 130.	In addition, evaluating unavailability of given resources within the first identified bandwidth portion is further taught by Clegg. (EX1002 ¶¶129-130.) Clegg teaches a technique for a multi-band 802.11 device to “increase data throughput by aggregating one or more of the available sub-channels for simultaneous use in transmitting and receiving data.” (EX1009 1:25-28.) To accomplish this, Clegg teaches the use of an “ultra-wideband tuner to <i>evaluate</i> the entire available spectrum between several communication bands.” (EX1009 3:60-63.) Specifically, an 802.11 access point may “search across 1) available bands (e.g., the 2.4 GHz, 5 GHz, and/or 60 GHz bands), and 2) sub-channels within each band, and measure interference on a carrier-by-carrier basis across those bands and sub-channels.” (EX1009 4:5-9.) Each carrier is evaluated to determine whether interference is “too high or above a threshold amount.” (EX1009 7:16-17.) Clegg can use this information to create a “channel map” identifying the available carriers across entire communication bands or discrete sub-channels “so that a user can select subcarriers from across those bands to form a cluster for communication.” (EX1009 7:19-22.) Petition at 40-41.

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	131. In my opinion, a POSITA would have understood Clegg's carrier-by-carrier evaluation of interference to disclose an evaluation of whether any of the given resources of the first identified bandwidth portion are unavailable for communication. 132. For the reasons I discuss above, <i>see</i> Section VI.A, in my opinion a POSITA would have been motivated to combine Clegg's teachings about how to mitigate carrier-specific interference into the combined Chincholi/Riggert system. The resulting combination would implement Chincholi's ability to dynamically allocate contiguous or non-contiguous bandwidth channels along with Clegg's ability to mitigate interference within channels on a carrier-by-carrier basis, thus increasing the bandwidth efficiency of the combined system. EX1002 ¶¶ 131-32.	A POSITA would have understood Clegg's carrier-by-carrier evaluation of interference to disclose an evaluation of whether any of the given resources of the first identified bandwidth portion are unavailable for communication. (EX1002 ¶131.) For the reasons discussed above, <i>see</i> Section VII.A, a POSITA would have been motivated to combine Clegg's teachings about how to mitigate carrier-specific interference into the combined Chincholi/Riggert system. The resulting combination would implement Chincholi's ability to dynamically allocate contiguous or non-contiguous bandwidth channels along with Clegg's ability to mitigate interference within channels on a carrier-by-carrier basis, thus increasing the bandwidth efficiency of the combined system. (EX1002 ¶132.) Petition at 41.
Grounds for Unpatentability: Claim 1(j)	k) 1[j]: (d) use the first wireless transceiver to transmit the first data stream to the recipient, without requiring disassociation of the recipient from either or both of the first and second actual MAC and PHY interfaces, using a subset of frequencies corresponding to only the given resources of the first bandwidth portion that are not unavailable for communication to thereby at least partially satisfy the first wireless bandwidth requirement of the first application; and 133. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 134. Clegg teaches the ability of an 802.11 network terminal to use a first wireless transceiver, without requiring disassociation of the recipient from the access point, to transmit a data stream using only the subset of frequencies that are not unavailable for communication. EX1002 ¶¶ 133-34.	k) 1[j]: (d) use the first wireless transceiver to transmit the first data stream to the recipient, without requiring disassociation of the recipient from either or both of the first and second actual MAC and PHY interfaces, using a subset of frequencies corresponding to only the given resources of the first bandwidth portion that are not unavailable for communication to thereby at least partially satisfy the first wireless bandwidth requirement of the first application; and Clegg teaches the ability of an 802.11 network terminal to use a first wireless transceiver, without requiring disassociation of the recipient from the access point, to transmit a data stream using only the subset of frequencies that are not unavailable for communication. (EX1002 ¶¶133-134.) Petition at 41-42.

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	135. Specifically, after evaluating the interference levels of each carrier across the available spectrum, Clegg teaches a capability for “notching out” specific OFDM subcarriers that suffer an unduly high amount of interference. (EX1009 at 7:15-19.) The remaining carriers, which are suitable for communication, are selected to comprise a “cluster of carriers for communication.” (EX1009 at 4:9-10.) The cluster of carriers may comprise: “1) contiguous carriers in a single sub-channel, 2) contiguous carriers spanning across more than one sub-channel, 3) discontinuous carriers in a single sub-channel, or 4) discontinuous carriers spanning across more than one sub-channel.” (EX1009 at 4:11-15.) In my opinion, a POSITA would have recognized that Clegg’s selection of a cluster of carriers enables transmission of the first data stream using only the subset of frequencies/given resources of the first identified bandwidth portion that are not unavailable. EX1002 ¶ 135.	Specifically, after evaluating the interference levels of each carrier across the available spectrum, Clegg teaches a capability for “notching out” specific OFDM subcarriers that suffer an unduly high amount of interference. (EX1009 7:15-19.) The remaining carriers, which are suitable for communication, are selected to comprise a “cluster of carriers for communication.” (EX1009 4:9-10.) The cluster of carriers may comprise: “1) contiguous carriers in a single sub-channel, 2) contiguous carriers spanning across more than one sub-channel, 3) discontinuous carriers in a single sub-channel, or 4) discontinuous carriers spanning across more than one sub-channel.” (EX1009 4:11-15.) A POSITA would have recognized Clegg’s selection of a cluster of carriers enables transmission of the first data stream using only the subset of frequencies/given resources of the first identified bandwidth portion that are not unavailable. (EX1002 ¶135.) Petition at 42.

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	136. Chincholi also does not “require” disassociation of recipient WTRUs from either or both of the actual MAC and PHY interfaces during operation. 137. Indeed, in my opinion, a POSITA would have also recognized the desirability of implementing Chincholi combined with the teachings of Riggert and Clegg to transmit the first data stream to the recipient without requiring “disassociation” of the recipient from either or both of the first and second actual MAC and PHY interfaces. For example, in the field of 802.11 systems—where each associated terminal is assigned a unique association identifier (“AID”)—it was well-known that avoiding disassociation after initial association was desirable, as repeatedly re-forming associations was inefficient and disruptive. EX1008 (U.S. Patent 9,379,868) (“Wang”) at 24:42-43 (“This approach is undesirable, can be blunt and can disrupt the on-going services (e.g., requires disassociation), at 24:57-62 (“The lack of update/change of the AID values . . . after an initial AID assignment is inherently inflexible and can prevent the realization power saving, among other considerations, that an update/change of the AID values can provide.”) Indeed, recognizing this issue, background prior art reference Wang described techniques in a multiple transceiver/MIMO system for effectuating an update to a recipient’s unique association identifier (“AID”) through various interactions with the system without requiring a disassociation of a wireless device from an access point. (EX1008 at 24:63-25:57.) EX1002 ¶¶ 136-37.	Chincholi also does not “require” disassociation of recipient WTRUs from either or both of the actual MAC and PHY interfaces during operation. (EX1002 ¶136.) Indeed, a POSITA would have also recognized the desirability of implementing Chincholi combined with the teachings of Riggert and Clegg to transmit the first data stream to the recipient without requiring “disassociation” of the recipient from either or both of the first and second actual MAC and PHY interfaces. For example, in the field of 802.11 systems—where each associated terminal is assigned a unique association identifier (“AID”)—it was well-known avoiding disassociation after initial association was desirable, as repeatedly re-forming associations was inefficient and disruptive. (EX1002 ¶137; EX1008 (U.S. Patent 9,379,868) (“Wang”) 24:42-43 (“This approach is undesirable, can be blunt and can disrupt the on-going services (e.g., requires disassociation)”, 24:57-62 (“The lack of update/change of the AID values . . . after an initial AID assignment is inherently inflexible and can prevent the realization power saving, among other considerations, that an update/change of the AID values can provide.”).) Indeed, recognizing this issue, background prior art reference Wang described techniques in a multiple transceiver/MIMO system for effectuating an update to a recipient’s unique association identifier (“AID”) through various interactions with the system without requiring a disassociation of a wireless device from an access point. Petition at 43.

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	138. In light of this background art, in my opinion a POSITA would have recognized that in implementing the Chincholi/Riggert/Clegg combination, it would have been desirable implement known dynamic AID reassignment techniques to avoid disassociation of recipients during operation including throughout any process of reallocating transceiver, channel, and/or bandwidth resources to a recipient. EX1002 ¶ 138.	In light of this background art, a POSITA would have recognized in implementing the Chincholi/Riggert/Clegg combination, it would be desirable implement known dynamic AID reassignment techniques to avoid disassociation of recipients during operation including throughout any process of reallocating transceiver, channel, and/or bandwidth resources to a recipient. (EX1002 ¶138.) Petition at 44.
Grounds for Unpatentability: Claim 1(k)	1) <i>l[k]: wherein, after the circuitry has been connected to the application interface and when the wireless networking is being used, the wireless networking device's utilization of the first available bandwidth portion of the first wireless transceiver does not prevent any wireless networking device devices from utilizing a range of frequencies corresponding to the remaining portion of the bandwidth availability of the first wireless transceiver for data transmission or reception purposes at the same time that the first bandwidth portion is being used for data transmission purposes.</i> 139. In my opinion, Chincholi/Riggert/Clegg discloses this limitation. 140. Chincholi discloses examples of "multi-WTRU multi-IP flow cases." (EX1005 at [0328].) For example, "[a] system may comprise multiple WTRUs, a single NT, and multiple IP flows from the NT to one or more WTRUs." (EX1005 at [0328].) This is disclosed, for example in Figure 3. EX1002 ¶¶ 139-140 (identical figure omitted).	1) <i>l[k]: wherein, after the circuitry has been connected to the application interface and when the wireless networking is being used, the wireless networking device's utilization of the first available bandwidth portion of the first wireless transceiver does not prevent any wireless networking device devices from utilizing a range of frequencies corresponding to the remaining portion of the bandwidth availability of the first wireless transceiver for data transmission or reception purposes at the same time that the first bandwidth portion is being used for data transmission purposes.</i> Chincholi discloses examples of "multi-WTRU multi-IP flow cases." (EX1005 [0328]; EX1002 ¶¶139-140.) For example, "[a] system may comprise multiple WTRUs, a single NT, and multiple IP flows from the NT to one or more WTRUs." (EX1005 [0328].) This is disclosed, for example in Figure 3. Petition at 44 (identical figure omitted).

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	141. To manage data flows for multiple WTRUs, Chincholi teaches techniques for queuing packets according to their access categories and/or WTRU addresses and optimizing the distribution of packets of multiple streams for multiple WTRUs across multiple RATs. (EX1005 at [0351]-[0356].) For example, Chincholi discloses a MAC layer of a given transceiver may implement multiple transmission buffers, denoted Q_k, where "i" refers to the WTRU for which a group of packets is designated and "k" refers to the IP flow associated with the group of packets. (EX1005 at [352].) EX1002 ¶ 141.	To manage data flows for multiple WTRUs, Chincholi teaches techniques for queuing packets according to their access categories and/or WTRU addresses and optimizing the distribution of packets of multiple streams for multiple WTRUs across multiple RATs. (EX1005 [0351]-[0356]; EX1002 ¶141.) For example, Chincholi discloses a MAC layer of a given transceiver may implement multiple transmission buffers, denoted Q_k, where "i" refers to the WTRU for which a group of packets is designated and "k" refers to the IP flow associated with the group of packets. (EX1005 [352].) Petition at 45.

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	142. Chincholi further discloses how utilization of the available transceiver bandwidth for one WTRU does not prevent other WTRUs from utilizing a range of frequencies corresponding to the remaining transceiver bandwidth at the same time. As discussed above, Chincholi's OMMA layer receives feedback metrics from each RAT. (EX1005 at [0161].) Amongst the feedback metrics are the "MAC Type," for example "OFDMA." (EX1005 at [0161] & Table 2.) OFDMA stands for "Orthogonal Frequency Division Multiple Access," which was a known wireless communication technique for dividing an available bandwidth into smaller subcarriers (i.e. frequency ranges) which are then allocated to different users. These subcarriers are described as orthogonal because they do not interfere with each other when simultaneously transmitted. In my opinion, a POSITA would have recognized that OFDMA techniques would allow multiple WTRUs to access different channels of the transceiver resources simultaneously and without interference. 143. Because Chincholi's RATs may provide feedback to the OMMA indicating that they are operating as an OFDMA MAC Type, in my opinion a POSITA would have recognized that Chincholi discloses the capability to allow multiple WTRUs to simultaneously utilize different portions of a transceiver's available bandwidth. EX1002 ¶¶ 142-43.	Chincholi further discloses how utilization of the available transceiver bandwidth for one WTRU does not prevent other WTRUs from utilizing a range of frequencies corresponding to the remaining transceiver bandwidth at the same time. As discussed above, Chincholi's OMMA layer receives feedback metrics from each RAT. (EX1005 [0161].) Amongst the feedback metrics are the "MAC Type," for example "OFDMA." (EX1005 [0161] & Table 2.) OFDMA stands for "Orthogonal Frequency Division Multiple Access," which was a known wireless communication technique for dividing an available bandwidth into smaller subcarriers (i.e. frequency ranges) which are then allocated to different users. (EX1002 ¶144.) These subcarriers are described as orthogonal because they do not interfere with each other when simultaneously transmitted. A POSITA would have recognized OFDMA techniques would allow multiple WTRUs to access different channels of the transceiver resources simultaneously and without interference. (EX1002 ¶142.) Because Chincholi's RATs may provide feedback to the OMMA indicating they are operating as an OFDMA MAC Type, a POSITA would have recognized Chincholi discloses the capability to allow multiple WTRUs to simultaneously utilize different portions of a transceiver's available bandwidth. (EX1002 ¶143.) Petition at 46.