IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,

SAMSUNG ELECTRONICS AMERICA, INC.

Petitioners,

v.

XIFI NETWORKS R&D, INC.

Patent Owner.

Post Grant Review No. 2025 – 00068

U.S. Patent No. 12,169,756

PETITION FOR POST GRANT REVIEW

TABLE OF CONTENTS

Page

I. INTRODUCTION 1
II. MANDATORY NOTICES 2
A. Real Party-in-Interest (37 C.F.R. §42.8(b)(1)) 2
B. Related Matters (37 C.F.R. §42.8(b)(2)) 2
1. Related Patent Office Proceedings 2
2. Related Litigation 3
C. Lead and Back-Up Counsel (37 C.F.R. §§42.8(b)(3)-(4) & 42.10(a)) 3
D. Payment of Fees (37 C.F.R. §§42.15(b) and 42.203) 4
E. Requirements For Post Grant Review (37 C.F.R. §§42.201(A)-(B), 42.204(A), AND 42.208) 4
III. IDENTIFICATION OF CHALLENGE AND RELIEF REQUESTED (37 C.F.R. §42.204(B) & 37 C.F.R. §42.22(A)(1)) 4
IV. BACKGROUND 5
A. ’756 Patent 5
1. Earliest Priority Date 5
2. Specification 5
3. Prosecution History (EX1004) 7
B. Asserted Prior Art (EX1002, ¶¶69-75) 7
1. Chincholi (EX1005) 7
2. Clegg (EX1009) 9
V. PERSON OF ORDINARY SKILL 10
VI. CLAIM CONSTRUCTION 10
VII. GROUNDS 11
A. Ground 1: Obvious In View Of Chincholi in Combination With Clegg, and Renders Claims 1-30 Obvious 11
1. Overview and Motivation to Combine 11
2. Claim 1 13

3. Claim 2 32
4. Claim 3 32
5. Claim 4 32
6. Claim 5 33
7. Claim 6 35
8. Claim 7 36
9. Claim 8 36
10. Claim 9 38
11. Claim 10 39
12. Claim 11 40
13. Claim 12 41
14. Claim 13 42
15. Claim 14 43
16. Claim 15 44
17. Claim 16 44
18. Claim 17 47
19. Claim 18 47
20. Claim 19 51
21. Claim 20 54
22. Claim 21 55
23. Claim 22 55
24. Claim 23 56
25. Claim 24 56
26. Claim 25: 57
27. Claim 26: 60
28. Claim 27 63
29. Claim 28 63
30. Claim 29 64
31. Claim 30 65

B. Ground 2: Patent-Ineligible Under 35 U.S.C. §101 66

1. The Claims Are Directed to Patent-Ineligible Subject Matter 66

2. No "Inventive Concept" in The Claims 73

3. The Dependent Claims Add Nothing Beyond the Abstract Idea of Claim 1 75

C. Ground 3: Invalid For Lack of Written Description 76

1. Background 76

2. Legal Standard 77

3. Relevant Summary of '756 Specification (EX1002 ¶¶181-183) 79

4. Deficient Written Description Limitations ("WD Limitations") 80

D. Ground 4: Indefiniteness 86

1. "partially simultaneously" (Claim 27) 87

2. "partially satisfy" (Claims 1, 18, 25) 88

VIII. CONCLUSION 89

TABLE OF AUTHORITIES

Page

Cases

Affinity Labs of Texas, LLC v. DIRECTV, LLC,
838 F.3d 1253 (Fed. Cir. 2016) 69, 72

Alice Corporation v. CLS Bank International,
573 U.S. 208 (2014)....................66, 73, 74

Ameranth, Inc. v. Domino's Pizza, LLC,
792 Fed. App'x 780 (Fed. Cir. 2019) 76

Apple, Inc. v. Ameranth, Inc.,
842 F.3d 1229 (Fed. Cir. 2016) 69

Ariosa Diagnostics, Inc. v. Sequenom, Inc.,
788 F.3d 1371 (Fed. Cir. 2015) 73

Berkheimer v. HP Inc.,
881 F.3d 1360 (Fed. Cir. 2018) 87, 89

BSG Tech LLC v. Buyseasons, Inc.,
899 F.3d 1281 (Fed. Cir. 2018) 75

Centocor Ortho Biotech, Inc. v. Abbott Lab'ys,
636 F.3d 1341 (Fed. Cir. 2011) 77

Chiron Corp. v. Genentech, Inc.,
363 F.3d 1247 (Fed. Cir. 2004) 83

Elec. Power Grp., LLC v. Alstom S.A.,
830 F.3d 1350 (Fed. Cir. 2016) 69, 74

Ericsson Inc. v. TCL Commc'n Tech. Holdings Ltd.,
955 F.3d 1317 (Fed. Cir. 2020) 67, 68, 70, 71, 73

Free Stream Media Corp. v. Alphonso Inc.,
996 F.3d 1355 (Fed. Cir. 2021) 69

Geoscope Techs. Pte. Ltd. v. Google LLC,
No. 2024-1003, 2025 WL 1276235 (Fed. Cir. May 2, 2025)....................68

Halliburton Energy Servs., Inc. v. M-I LLC,
514 F.3d 1244 (Fed. Cir. 2008) 69

ICU Med., Inc. v. Alaris Med. Sys, Inc.,
558 F.3d 1368 (Fed. Cir. 2009) 78, 83

Int'l Bus. Machines Corp. v. Zillow Grp., Inc.,
50 F.4th 1371 (Fed. Cir. 2022) 68, 69

Intell. Ventures I LLC v. Symantec Corp.,
838 F.3d 1307 (Fed. Cir. 2016) 67

Interval Licensing LLC v. AOL, Inc.,
766 F.3d 1364 (Fed. Cir. 2014) 86, 87, 89

Interval Licensing LLC v. AOL, Inc.,
896 F.3d 1335 (Fed. Cir. 2018) 70

LizardTech, Inc. v. Earth Res. Mapping, Inc.,
424 F.3d 1336 (Fed. Cir. 2005) 77

Lockwood v. Am. Airlines, Inc.,
107 F.3d 1565 (Fed. Cir. 1997) 78

Nautilus, Inc. v. Biosig Instruments, Inc.,
572 U.S. 898 (2014)...86, 87

PersonalWeb Techs. LLC v. Google LLC,
8 F.4th 1310 (Fed. Cir. 2021) 67

Phillips v. AWH Corp.,
415 F.3d 1303 (Fed. Cir. 2005) 10

PowerOasis, Inc. v. T-Mobile USA, Inc.,
522 F.3d 1299 (Fed. Cir. 2008) 77, 78

Rady v. Bos. Consulting.
No. 2022-2218, 2024 WL 1298742 (Fed. Cir. Mar. 27, 2024) 72

Riggs Tech. Holdings, LLC v. Cengage Learning, Inc.,
No. 2022-1468, 2023 WL 193162 (Fed. Cir. Jan. 17, 2023)............................74

Rivera v. Int'l Trade Comm'n,
857 F.3d 1315 (Fed. Cir. 2017) 78

SAP Am., Inc. v. InvestPic, LLC,
898 F.3d 1161 (Fed. Cir. 2018) 69

Sensormatic Elecs., LLC v. Wyze Labs, Inc.,
No. 2020-2320, 2021 WL 2944838 (Fed. Cir. July 14, 2021) 74

In re Taasera Licensing LLC, Pat. Litig.,
No. 22-MD-03042, 2023 WL 8628323 (E.D. Tex. Dec. 13, 2023) 88, 89

In re TLI Commc'ns LLC Pat. Litig.,
823 F.3d 607 (Fed. Cir. 2016) 73

Transperfect Glob., Inc. v. Matal,
703 F. App'x 953 (Fed. Cir. 2017) 78

TurboCare Div. of Demag Delaval Turbomachinery Corp. v. Gen. Elec. Co.,
264 F.3d 1111 (Fed. Cir. 2001) 78

Two-Way Media Ltd. v. Comcast Cable Communications,
874 F.3d 1329 (Fed. Cir. 2017) 71

In re Xencor, Inc.,
130 F.4th 1350 (Fed. Cir. 2025) 77

XiFi Networks R&D, Inc. v Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.,
Case No. 2:24-cv-01057-JRG (E.D. Tex.) 3

Rules/Statutes

35 U.S.C. §101 ....4, 66, 69, 76

35 U.S.C. §§101, 103, and 112 4

35 U.S.C. §103 ....1, 4

35 U.S.C. § 112 ....77, 87

35 U.S.C. §112's 77

Other Authorities

37 C.F.R. §42.8(a)(1) 2

(37 C.F.R. §42.8(b)(1)) 2

(37 C.F.R. §42.8(b)(2)) 2

(37 C.F.R. §§42.8(b)(3)-(4) & 42.10(a)) 3

(37 C.F.R. §§42.15(b) and 42.203) 4

37 C.F.R. §42.22(A)(1) §42.204(B) 4

(37 C.F.R. §§42.201(A)-(B), 42.204(A), AND 42.208) 4

MPEP §2106 66

PGR2023-00023-26 (Oct. 29, 2024) 66

U.S. Patent 9,055,592 9

U.S. Patent 10,567,147 62

U.S. Patent 11,818,591 .... 49, 80, 85

U.S. Patent 12,169,756
..... 1, 2, 3, 4, 5, 7, 9, 10, 11, 16, 22, 23, 28, 36, 44, 49, 62, 67, 69, 71, 76, 77, 79, 81, 82, 83, 84, 85, 88

U.S. Patent Nos. 11,818,591, 11,849,337, 11,856,414, 11,974,143, 11,950,105, 12,003,976, 12,015,933, 12,114,177, 12,250,564, and 12,190,198 2

TABLE OF EXHIBITS

Exhibit	Description
EX1001	U.S. Patent No. 12,169,756 ("the '756 patent")
EX1002	Declaration of Kevin Almeroth, Ph.D.
EX1003	Intentionally Omitted
EX1004	File History of U.S. Patent No. 12,169,756
EX1005	WO 2013/126859 ("Chincholi")
EX1006	Intentionally Omitted
EX1007	U.S. Patent Application 2009/0141691 ("Jain")
EX1008	U.S. Patent 9,379,868 ("Wang")
EX1009	U.S. Patent 9,055,592 ("Clegg")
EX1010	U.S. Patent 10,567,147 ("DiFazio")
EX1011	Curriculum Vitae of Kevin Almeroth Ph.D.
EX1012	Intentionally Omitted
EX1013	Intentionally Omitted
EX1014	U.S. Patent 5,345,599 ("Paulraj")
EX1015	Gerard J. Foschini, "Layered Space-Time Architecture" (Foschini, Bell Labs Technical Journal, 1(2), 41-59) (1996)
EX1016	Intentionally Omitted
EX1017	File History of U.S. Patent No. 11,818,591
EX1018	First Amended Complaint (Dkt. 13) in *XiFi Networks R&D, Inc. v. Samsung Electronics Co., et al.*, No. 2:24-cv-1057 (E.D. Tex.)

LIST OF CHALLENGED CLAIMS

Claims 1-30	
No.	**Claim Limitation**
1[pre]	A wireless networking device, comprising:
1[a]	a processing interface configured to, during use of the wireless networking device, interact with an application providing a data stream and having a wireless bandwidth requirement;
1[b]	first and second actual MAC interfaces connected to the processing interface;
1[c]	first and second actual PHY interfaces respectively connected to the first and second actual MAC interfaces;
1[d]	first and second wireless transceivers respectively associated with the first and second actual PHY interfaces, wherein the first and second wireless transceivers (i) are suitable for use in a wireless local area network, (ii) respectively have first and second bandwidth availabilities up to first and second actual bandwidths, and (iii) are adapted to respectively emit radio waves in first and second different bands of frequencies; and
1[e]	wherein the processing interface comprises, at least one virtual MAC interface, at least one resource monitoring interface that, during operation of the wireless networking device, provides information regarding the first and second bandwidth availabilities to the virtual MAC interface, and
1[f]	the virtual MAC interface being configured to, during use of the wireless networking device and in a manner transparent to any layer of the wireless networking device above the processing interface,
1[g]	(i) request or create a first association between a recipient and the first actual MAC and PHY interfaces and a second association between the recipient and the second actual MAC and PHY interfaces, and
1[h]	(ii) use the information provided to it by the resource monitoring interface to make allocation decisions with respect to first and second bandwidth availabilities to at least partially satisfy the bandwidth requirement of the data stream.
2	The wireless networking device of claim 1, wherein the first frequency band is specified in at least one member of the family of IEEE 802.11 standards that was in existence as of Oct. 30, 2013.

3	The wireless networking device of claim 1, wherein the second frequency band is specified in at least one member of the family of IEEE 802.11 standards that was in existence as of Oct. 30, 2013.
4	The wireless networking device of claim 1, wherein the at least one virtual MAC interface includes a decision block.
5	The wireless networking device of claim 1, wherein the at least one virtual MAC interface includes a processing block.
6	The wireless networking device of claim 1, wherein the at least one virtual MAC interface includes an ultra-streaming block.
7	The wireless networking device of claim 1, wherein the resource monitoring interface comprises at least one RF block.
8	The wireless networking device of claim 1, wherein the resource monitoring interface comprises multiple RF blocks.
9	The wireless networking device of claim 1, wherein the resource monitoring interface is configured to, during use of the wireless networking device, process the data stream before it is sent to any actual MAC interface.
10	The wireless networking device of claim 1, wherein the processing interface comprises multiple resource monitoring interfaces.
11	The wireless networking device of claim 1, wherein the processing interface comprises multiple virtual MAC interfaces.
12	The wireless networking device of claim 1, wherein the processing interface comprises a bandwidth allocator.
13	The wireless networking device of claim 1, wherein the resource monitoring interface is not contiguous with the virtual MAC interface.
14	The wireless networking device of claim 1, wherein the wireless networking device comprises a wireless access point.
15	The wireless networking device of claim 1, wherein the information provided by the resource monitoring interface to the virtual MAC interface is received by the resource monitoring interface directly from at least one of the first and second actual PHY interfaces.
16	The wireless networking device of claim 1, wherein the information provided by the resource monitoring interface to the virtual MAC interface is received by the resource monitoring interface directly from at least one of the first and second actual MAC interfaces.
17	The wireless networking device of claim 1, wherein the allocation decisions involve use of at least some of the first and second bandwidth availabilities.

18[a]	The wireless networking device of claim 1, wherein the processing interface is configured to, 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,
18[b]	(i) identify at least one portion of the actual bandwidth of one of the first and second wireless transceivers, the identified bandwidth portion comprising a set of given resources, and
18[c]	(ii) transmit the data stream to the recipient using only the given resources of the identified bandwidth portion that are not unavailable to thereby at least partially satisfy the bandwidth requirement.
19[a]	The wireless networking device of claim 18, wherein the processing interface is configured to, 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,
19[b]	(i) evaluate at least one data transfer characteristic of a first identified bandwidth portion of each of the first and second wireless transceivers, and
19[c]	(ii) transmit the data stream to the recipient using the first identified bandwidth portion of either the first or second wireless transceiver based upon a comparison of the evaluated data transfer characteristics.
20	The wireless networking device of claim 19, wherein the evaluation of the at least one data transfer characteristic comprises evaluation of bandwidth unavailability.
21	The wireless networking device of claim 20, wherein the evaluation of the at least one data transfer characteristic comprises evaluation of bandwidth unavailability and received signal strength of at least one communication from the recipient.
22	The wireless networking device of claim 18, wherein the first identified bandwidth portion of the first wireless transceiver comprises two non-contiguous portions of the bandwidth of the first wireless transceiver.
23	The wireless networking device of claim 22, wherein the first identified bandwidth portion of the second wireless transceiver comprises two non-contiguous portions of the bandwidth of the second wireless transceiver.
24	The wireless networking device of claim 18, wherein the allocation decisions are based at least upon a signal type associated with the data stream.

25[a]	The wireless networking device of claim 18, wherein the processing interface is configured to, 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,
25[b]	aggregate a first identified bandwidth portion of the first wireless transceiver with a first identified bandwidth portion of the second wireless transceiver to at least partially satisfy the bandwidth requirement of the application.
26[a]	The wireless networking device of claim 18, wherein the processing interface is configured to, 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,
26[b]	transmit the data stream to the recipient using the first wireless transceiver and to receive a second data stream that is transmitted from the recipient using the second transceiver.
27	The wireless networking device of claim 26, wherein the transmission of the data stream from the first wireless transceiver is at least partially simultaneous with the reception of the second data stream by the second wireless transceiver.
28	The wireless networking device of claim 27, wherein the transmission of the data stream from the first wireless transceiver is simultaneous with the reception of the second data stream by the second wireless transceiver.
29	The wireless networking device of claim 27, wherein a first identified portion of a bandwidth availability of a third wireless transceiver is aggregated with the first identified portion of the bandwidth of the first wireless transceiver to transmit the data stream to the recipient.
30	The wireless networking device of claim 27, wherein a first identified portion of a bandwidth availability of a third wireless transceiver is aggregated with the first identified portion of the bandwidth of the second wireless transceiver to receive the second data stream from the recipient.

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (together, "Petitioner") request Post Grant Review of claims 1–30 ("the Challenged Claims") of U.S. Patent 12,169,756 ("the '756 patent"), assigned to XiFi Networks R&D Inc., Patent Owner ("PO").

First, the Challenged Claims are obvious. Long before the earliest priority date of the '756 patent, multi-transceiver, wireless networking systems were ubiquitous, and the claimed techniques for selectively using bandwidth resources were well-established. Accounting for every limitation, the '756 patent Challenged Claims are invalid under 35 U.S.C. §103.

Second, the claims are directed to patent-ineligible subject matter. They purport to claim the abstract idea of selecting available communication resources based on feedback information. Beyond that, the claims merely recite known components (*e.g.*, applications, MAC and PHY interfaces, wireless transceivers) and vague results-oriented steps (*e.g.*, create an "association," use "information… to make allocation decisions")—all of which are routine and conventional techniques.

Third, the '756 patent's written description does not demonstrate that the named inventors had possession of multiple key limitations of the Challenged Claims, which were drafted more than a decade after the purported priority date to read on features of the recently adopted WiFi 7 specification. The newly drafted claim elements have gone far beyond the patent's disclosure, finding closer support in the prior art than they do in the '756 specification.

Fourth, the Challenged Claims do not inform POSITA about their scope to understand the invention with reasonable certainty and thus are indefinite. Many of the claimed limitations rely on subjective terms of degree, and the specification provides no standard for measuring the degree.

II. MANDATORY NOTICES

Pursuant to 37 C.F.R. §42.8(a)(1), the following mandatory notices are provided.

A. Real Party-in-Interest (37 C.F.R. §42.8(b)(1))

The real parties-in-interest for Petitioner are Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.

B. Related Matters (37 C.F.R. §42.8(b)(2))

1. Related Patent Office Proceedings

The '756 patent is in the same family as U.S. Patent Nos. 11,818,591, 11,849,337, 11,856,414, 11,974,143, 11,950,105, 12,003,976, 12,015,933, 12,114,177, 12,250,564, and 12,190,198. Petitioner already filed IPR petitions against the first eight patents. Petitioner is concurrently filing PGR petitions against the last two patents.

2. Related Litigation

Patent Owner is currently asserting the ’756 patent against Petitioner in *XiFi Networks R&D, Inc. v Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.*, Case No. 2:24-cv-01057-JRG (E.D. Tex.).

C. Lead and Back-Up Counsel (37 C.F.R. §§42.8(b)(3)-(4) & 42.10(a))

Electronic service may be made on the email addresses identified below and in the accompanying Power of Attorney.

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D. Payment of Fees (37 C.F.R. §§42.15(b) and 42.203)

The Office is authorized to charge the fee required for this Petition (and any additional fees) to Deposit Account No. 50-5708.

E. Requirements For Post Grant Review (37 C.F.R. §§42.201(A)-(B), 42.204(A), AND 42.208)

Petitioner certifies that the ’756 patent is available for PGR and Petitioner is not barred or estopped from requesting this proceeding.

The earliest possible effective filing date for the ’756 patent is October 30, 2013, the filing date of its earliest-filed provisional applications (61/897,219 and 61/897,216).

The ’756 patent issued on December 17, 2024, and the instant Petition was timely filed within nine months of issuance.

III. IDENTIFICATION OF CHALLENGE AND RELIEF REQUESTED (37 C.F.R. §42.204(B) & 37 C.F.R. §42.22(A)(1))

Petitioner requests PGR of claims 1–30 of the ’756 patent and requests that the Board cancel those claims as unpatentable under at least 35 U.S.C. §§101, 103, and 112.

The specific statutory grounds for Petitioner’s challenge are as follows:

Ground	Claims	Grounds
1	1–30	§103: Obvious In View Of WO 2013/126859 (“Chincholi”) in combination with US 9,055,592 (“Clegg”)
2	1–30	§101: Patent-ineligible

3	1–30	§112 ¶1: Inadequate Written Description
4	1–30	§112 ¶2: Indefiniteness

IV. BACKGROUND

A. ’756 Patent

1. Earliest Priority Date

The ’756 patent is a post-AIA patent whose earliest possible priority date is October 30, 2013 via U.S. Provisional Applications 61/897,216 and 61/897,219.[1] (EX1002 ¶¶50-53.)

2. Specification

The ’756 patent relates to evaluating the bandwidth requirements of applications and the bandwidth availabilities of wireless transceiver resources, and allocating available bandwidth to satisfy the requirements. (EX1001, Abstract; EX1002 ¶54.)

The architecture “includes an application layer, actual MAC and PHY layers, and a processing layer between the actual MAC and PHY layers.” *Id.* at 2:58-62. The processing layer may comprise “virtual MAC and PHY layers” that “enable simultaneous allocation of multiple PHY resources for different signal types associated with different applications.” (EX1001 at 3:52-60; EX1002 ¶55.)

[1] Petitioner reserves the right to challenge the priority date in other proceedings.

For example, in the embodiment of Figure 6, the wireless networking device uses the virtual MAC and PHY layers to configure the resources of two separate transceivers to each handle the bandwidth requirement of a respective application for a single recipient device using asymmetric transmit and receive cycles. (EX1001 at 5:50-6:2; EX1002 ¶¶56-58.)

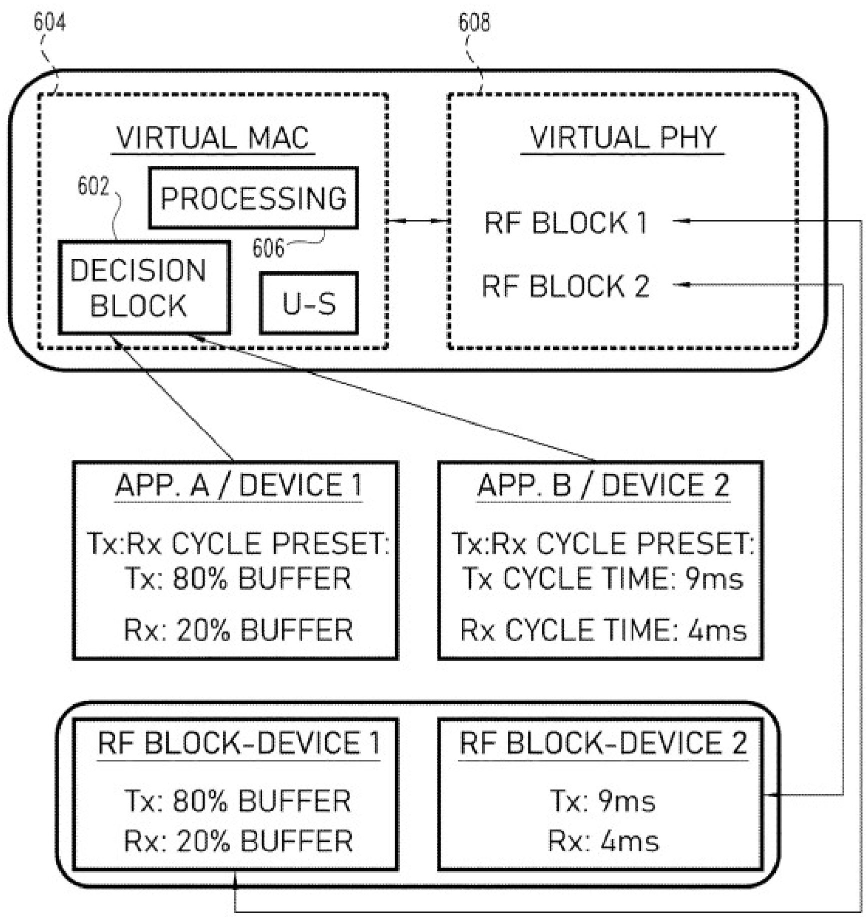

Fig. 6

3. Prosecution History (EX1004)

The ’756 patent was filed on July 29, 2024 as application 18/787,267, which was a continuation of application 18/621,421, currently pending. The applicant’s Track One request was granted on September 4, 2024. (EX1002 ¶59.) The Examiner issued only one non-final rejection, directed only to pending claim 25, on September 26, 2024 that merely found the term “the type of information”—removed in an October 11, 2024 amendment—to be indefinite. The Examiner issued a notice of allowance on October 30, 2024. (EX1002 ¶60.)

B. Asserted Prior Art (EX1002, ¶¶69-75)

1. Chincholi (EX1005)

WO 2013/126859 (“Chincholi”) has an international filing date of February 24, 2013, and was published on August 29, 2013. It is prior art under §102(a)(1) and §102(a)(2).

Chincholi discloses techniques “to manag[e] multiple radio access technology (RAT) interfaces to enable opportunistic RAT selection and aggregation for sending data traffic over the RAT interfaces.” (EX1005 ¶[0003].) Chincholi discloses a network terminal, such as an “access point,” that “may be configured to work in an infrastructure mode or an adhoc mode, for example, in an IEEE 802.11 based Wi-Fi system.” (EX1005 ¶[0115].) An 802.11 access point configured according to

Chincholi enables "multiple RATs simultaneously [to] provide increased bandwidth and/or increased reliability for an application." (EX1005 ¶[0194].)

Chincholi discloses an "Opportunistic Multiple-Medium Access Control (MAC) Aggregation (OMMA) layer," a "single thin software layer" that "enable[s] one RAT to operate over industrial scientific medical (ISM) and another RAT to operate over a TVWS band for the same IP flow." (EX1005 ¶[0120]). Figure 5 shows an OMMA layer enabling a dual-RAT aggregation device in an 802.11n network:

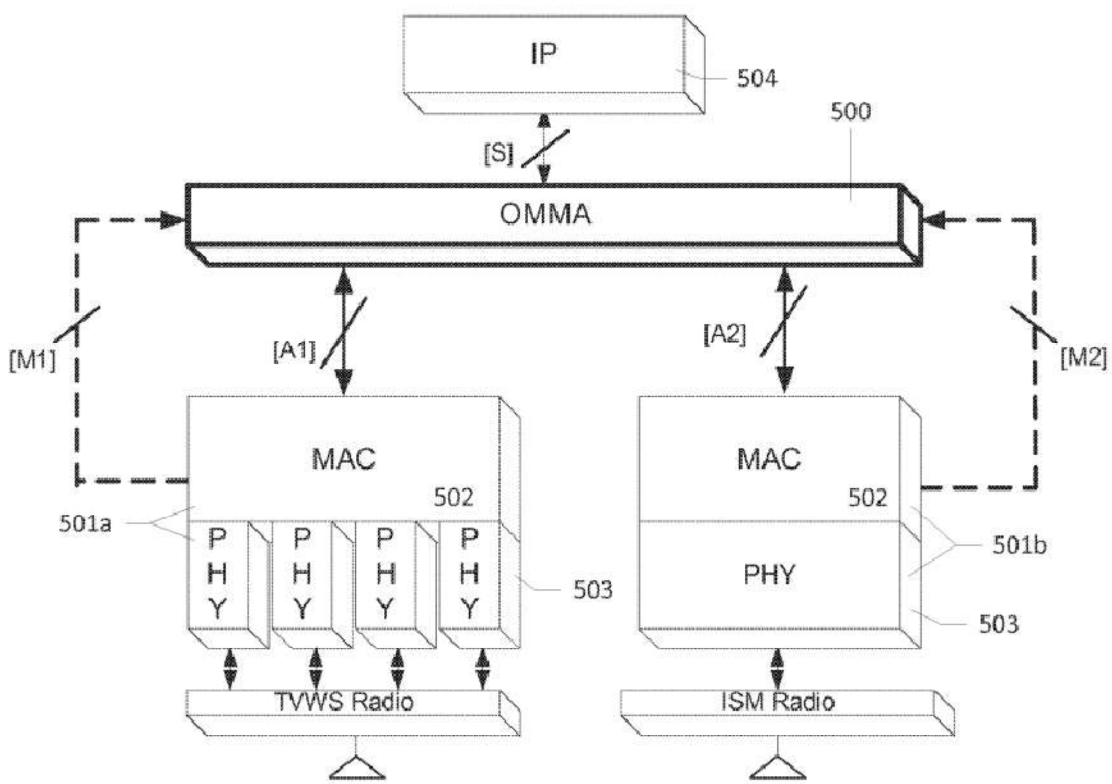

FIG. 5

The OMMA layer processes single or multiple IP flows (*i.e.*, application data streams) and uses feedback from each RAT to best allocate transceiver resources to meet the IP flows' bandwidth requirements. The OMMA layer may aggregate available bandwidth of multiple transceivers, enabling communication paths between network devices using one or more RATs. (EX1005 ¶[0383].) For example, first and second packets of a single IP flow may be scheduled for simultaneous transmission to a recipient across the first and second RAT. (EX1005 ¶[0385].)

Chincholi was not before the examiner during prosecution of the '756 patent.

2. Clegg (EX1009)

U.S. Patent 9,055,592 ("Clegg") was filed on January 7, 2013. It is prior art under § 102(a)(2).

Clegg discloses systems and methods for IEEE 802.11 communication using carrier specific interference mitigation. Clegg "utilize[s] carriers across multiple sub-channels, even across disjointed bands (e.g., 2.4 GHz, 5 GHz, and or 60 GHz bands), without regard to whether those carriers are within an otherwise unavailable sub-channel," allowing an 802.11 device to "fully utilize the available spectrum." (EX1009 at 1:32-37.)

Clegg was first disclosed by the applicant during prosecution of the '756 patent in an October 11, 2024 supplemental IDS.

V. PERSON OF ORDINARY SKILL

A person of ordinary skill in the art as of the asserted priority date ("POSITA") had at least a Bachelor of Science in electrical engineering, computer engineering, or similar fields and at least two years of practical experience in the field of computer networks and wireless communication applications. More education can supplement for less practical experience, and vice versa.

Petitioner's expert, Dr. Almeroth, met this level by the priority date. (EX1002 ¶¶61-64.)

VI. CLAIM CONSTRUCTION

In a PGR proceeding, claim terms are to be construed in accordance with *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). No express constructions are required to find the '756 patent claims invalid. To the extent relevant, Petitioner addresses the plain meaning of certain terms in the analysis for the presented Grounds.

VII. GROUNDS

A. Ground 1: Obvious In View Of Chincholi in Combination With Clegg, and Renders Claims 1-30 Obvious[2]

1. Overview and Motivation to Combine

Chincholi in combination with Clegg renders claims 1-30 obvious. As discussed in more detail below, Chincholi teaches the same architecture as the '756 patent, including a wireless networking device with multiple transceivers, each having actual MAC and PHY interfaces. Chincholi uses a single "***Opportunistic Multiple-Medium Access Control (MAC) Aggregation layer***," positioned above the actual MAC-PHY layers of each transceiver, to aggregate available bandwidth portions to efficiently meet the requirements of data streams from one or more applications. (EX1005 ¶[0122-0123]; EX1002 ¶76.)

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[2] Unless noted otherwise, all emphases in quotes and annotations to figures from prior art references are added.

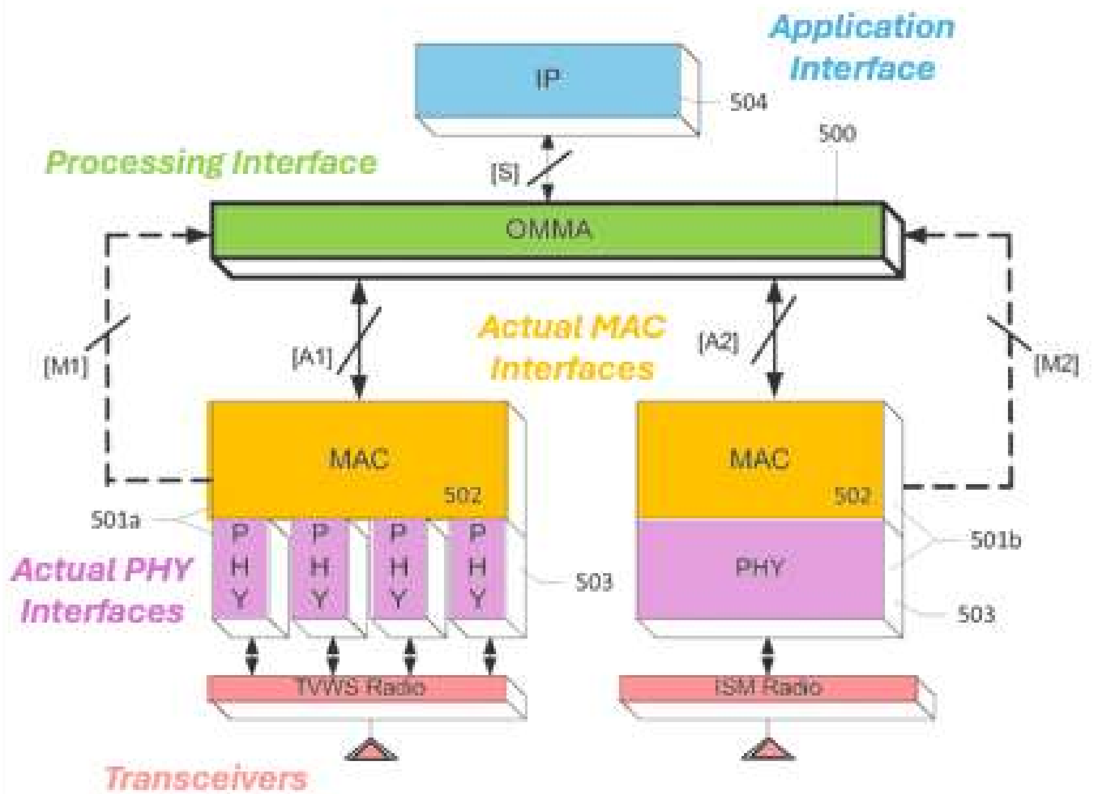


FIG. 5

Chincholi teaches continuous monitoring of the "number of available resources on the medium" and techniques for distributing IP packets across the RATs accordingly. (EX1005 ¶[0161].) Chincholi's approach enables the system to respond to bandwidth channels, or portions of bandwidth channels, becoming unavailable during transmission of a data stream. (EX1002 ¶77.) A POSITA would have understood that Chincholi's monitoring and response techniques could be further enhanced by the teachings of Clegg. (EX1002 ¶77.) Clegg teaches techniques for addressing carrier-specific interference within bandwidth channels, allowing for any given channel full usage of the channel bandwidth that is not unavailable for communication. Like Chincholi, Clegg arises in the field 802.11 wireless communication networks and is addressed to increasing bandwidth efficiency. (EX1009 at 1:25-37.)

A POSITA would have been motivated to incorporate the teachings of Clegg to improve the Chincholi system by allowing it to more flexibly and efficiently utilize available bandwidth channels that may experience carrier-specific interference within the channels. (EX1002 ¶78.) Chincholi already teaches dynamic allocation of contiguous or non-contiguous channels, and Clegg merely provides additional detail on how to mitigate carrier-specific interference within any given channel. (EX1002 ¶78.) The teachings of Clegg are complementary to Chincholi, and a POSITA would have recognized that Clegg's teachings could be easily implemented into Chincholi without technical challenge. (EX1002 ¶78.)

In the analysis below, the combined prior art system will be referred to as Chincholi/Clegg.

2. Claim 1

(a) 1[pre]: A wireless networking device, comprising:

Chincholi discloses "[s]ystems, methods, and instrumentalities… for managing multiple radio access technology (RAT) interfaces" (EX1005, Abstract; [0003]) and "enabl[ing] opportunistic RAT selection and aggregation for sending data traffic over the RAT interfaces." (EX1005 ¶[0003]; EX1002 ¶80.) "In multi-

RAT systems reception and/or transmission may be performed over multiple RATs. For example, ***a network terminal (NT)*** (e.g., an ***access point (AP)***…) and ***a wireless transmit/receive unit (WTRU)***… may communicate over multiple parallel paths." (EX1005 ¶[0002].)

Chincholi discloses that a network terminal ("NT"), such as an access point, or a wireless transmit/receive unit ("WTRU") "may be configured to work in an infrastructure mode or an adhoc mode, for example, in an IEEE802.11 based Wi-Fi system," *i.e.*, both are a ***wireless networking device***. (EX1005 ¶[0115].) Thus, as discussed in the below limitations, Chincholi/Clegg discloses a wireless networking device. (EX1002 ¶81.)

(b) 1[a]: a processing interface configured to, during use of the wireless networking device, interact with an application providing a data stream and having a wireless bandwidth requirement;

"an application providing a data stream": Chincholi discloses that "[u]sing multiple RATs simultaneously may provide the benefit of increased bandwidth for an ***application*** (*e.g.*, an IP flow) as well as increased reliability." (EX1005 ¶[0191]; EX1002 ¶¶82-83.) The first data stream of a first application is referred to as an "IP flow." (EX1005 ¶[0132] ("***A single IP flow may refer to a stream of IP packets belong to a particular application***.").) 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.e.* ***data stream***) is provided by the application when the wireless networking device is being used. (EX1005 ¶[0138]], Table 1 ("S" interface is for "Incoming/Outgoing IP Packets").) The "[S]" interface from the IP layer for the IP stream is therefore an ***application interface associated with a first application.*** (EX1002 ¶83.)

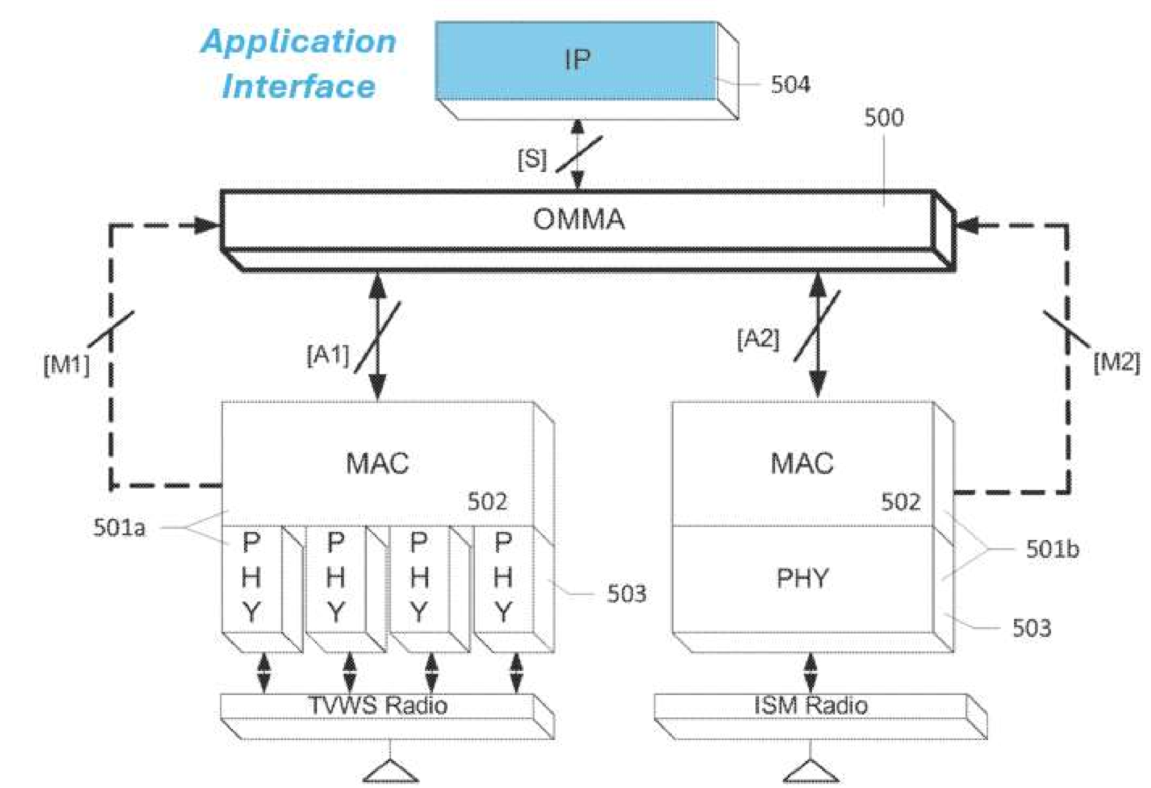


FIG. 5

"a processing interface configured to, during use of the wireless networking device, interact with an application": Chincholi further discloses that its "application interface" is connected to and interacts with a "processing interface." (EX1002 ¶84.) Chincholi's ***processing interface*** is referred an "***Opportunistic Multiple-Medium Access Control (MAC) Aggregation (OMMA) layer***." (EX1005

¶[0003].) A POSITA would have understood that the plain meanings of "interface" and "layer" in the context of the '756 patent are congruent, which is underscored by the specification describing layers having the same functionality as the claimed interfaces, and the prosecution history, where Applicant interchangeably used the terms "layer" and "interface" to describe Figure 1. (EX1002 ¶84; EX1017, 8/8/23 Response to Non-Final Office Action). The OMMA layer is a common layer/module between the IP layer/module and the multiple RAT layers/modules. (EX1005 ¶[0137]; *see also id.* ¶[0120] ("[T]he single thin software layer may enable one RAT to operate over industrial scientific medical (ISM) and another RAT to operate over a TVWS band for the same IP flow.").) An exemplary OMMA layer enabling a dual-RAT aggregation device in a 802.11n network is shown in Figure 5:

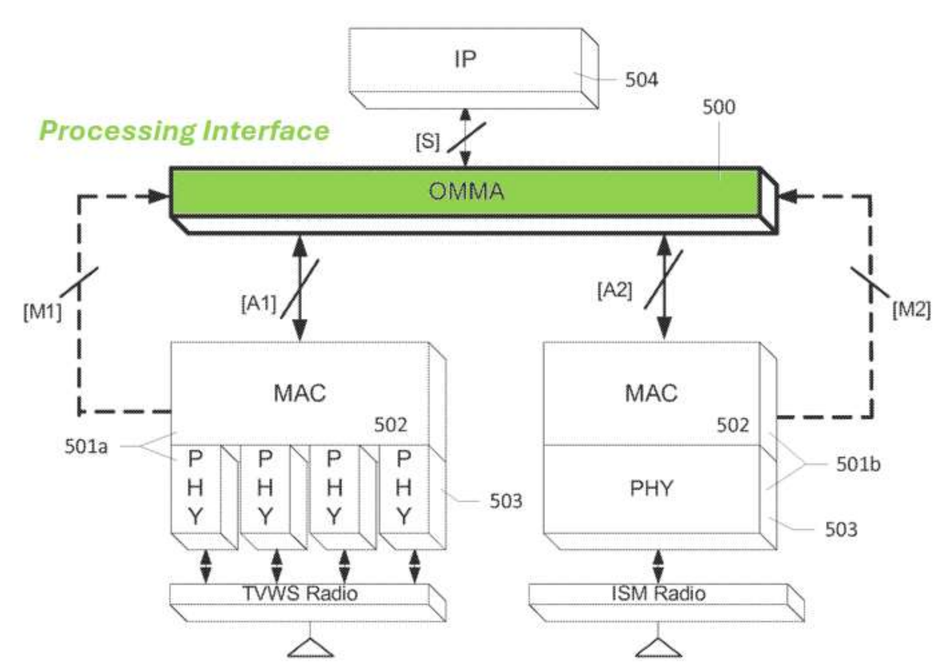


FIG. 5

The IP layer is connected to the OMMA layer and provides IP packets that the OMMA layer processes. (EX1005 ¶[0138]); (EX1002 ¶85.) The OMMA "may allow for enhanced throughput and reduced latency for a single IP flow." (EX1005 ¶[0120].) The OMMA layer is therefore a processing layer, which processes IP packets and provides an ***interface*** between the IP layer and actual MAC layers, *i.e.*, a ***processing interface***.

"application… having a wireless bandwidth requirement": Chincholi teaches "a bandwidth requirement for an IP flow." (EX1005 ¶[260]; EX1002 at ¶86.)

(c) 1[b]: first and second actual MAC interfaces connected to the processing interface;

Chincholi discloses first and second ***actual MAC interfaces*** connected 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 ¶[0138] ("***The RATs 501a, 501b may comprise a MAC layer/module 502*** and one or more physical layers/modules 503."); EX1002 ¶87.)

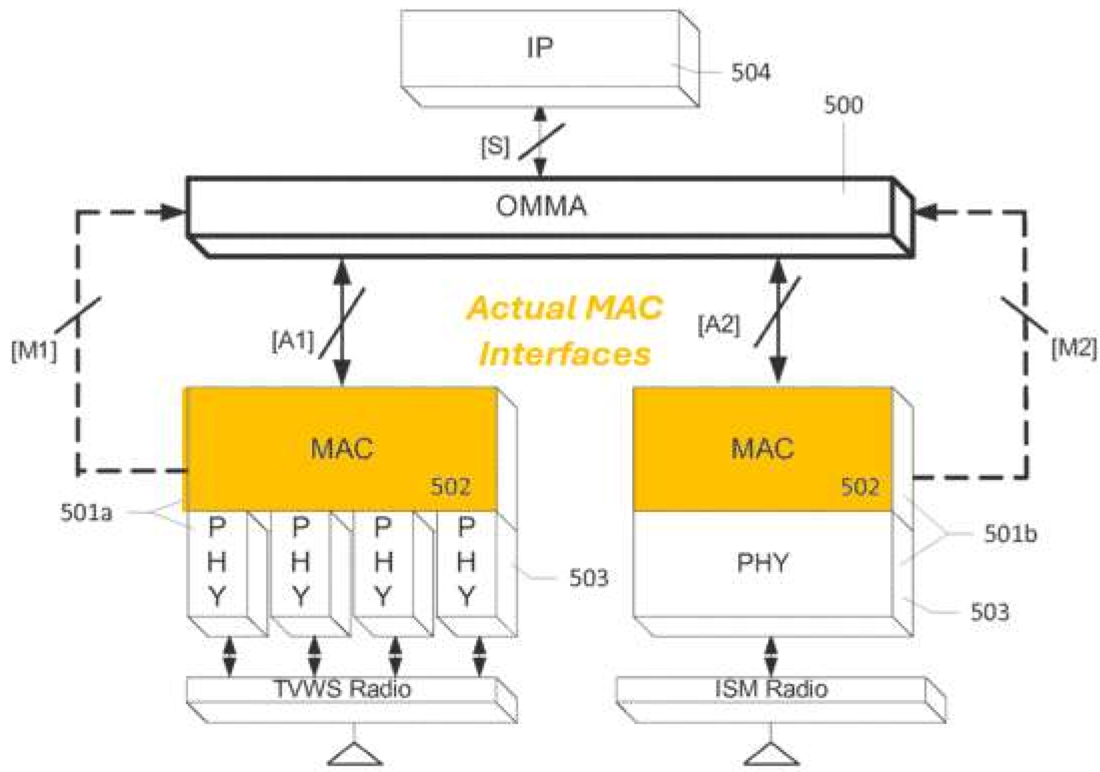


FIG. 5

(d) 1[c]: first and second actual PHY interfaces respectively connected to the first and second actual MAC interfaces;

Each RAT in Chincholi comprises ***one or more physical layers***. (EX1005 ¶[0138] ("The RATs 501a, 501b may comprise a MAC layer/module 502 and ***one or more physical layers/modules 503***."); EX1002 ¶88.) The actual PHY layers are respectively connected to the actual MAC interfaces:

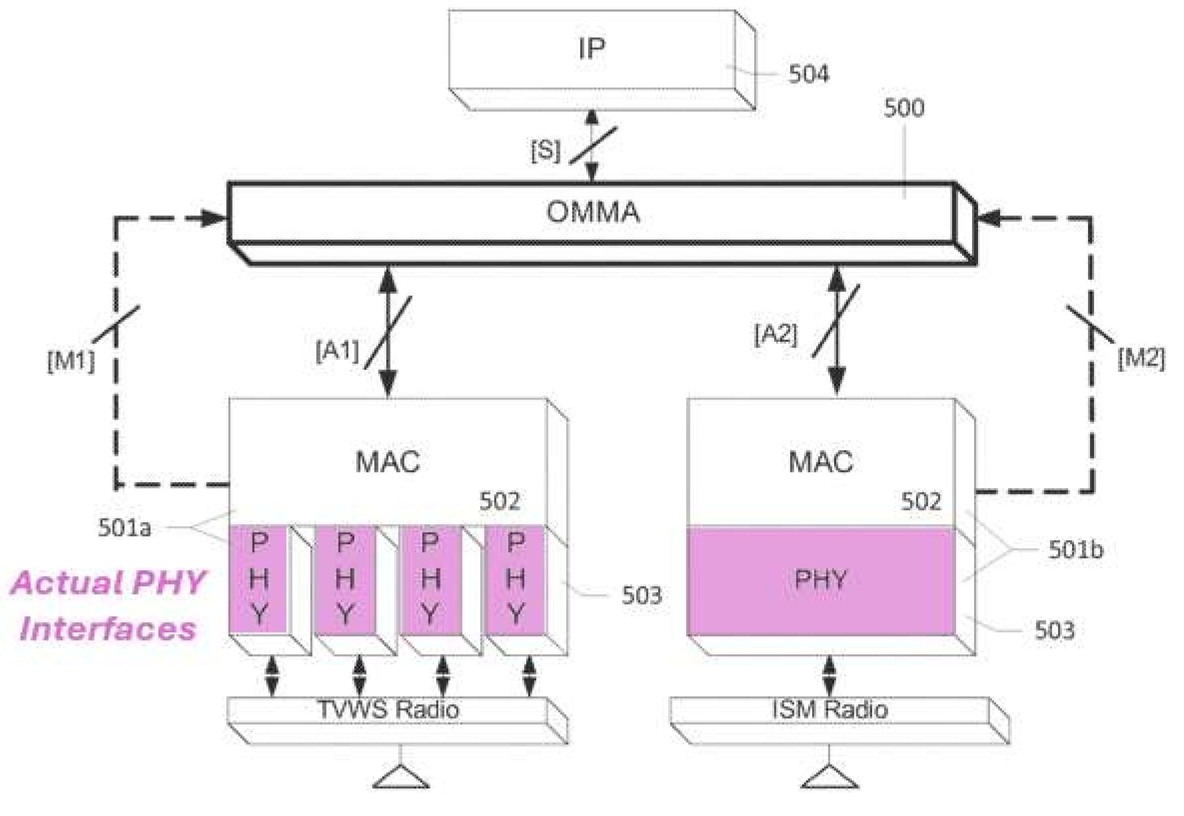


FIG. 5

(e) 1[d]: first and second wireless transceivers respectively associated with the first and second actual PHY interfaces, wherein the first and second wireless transceivers (i) are suitable for use in a wireless local area network, (ii) respectively have first and second bandwidth availabilities up to first and second actual bandwidths, and (iii) are adapted to respectively emit radio waves in first and second different bands of frequencies; and

"first and second wireless transceivers respectively associated with the first and second actual PHY interfaces… suitable for use in a wireless local area network": Chincholi Figure 5 illustrates that each actual PHY interface of each RAT is associated with an *antenna/radio frequency (RF) front-end pair*. (EX1005

¶[0133]; EX1002 ¶¶89-90.) The ***antenna/radio frequency (RF) front-end pairs*** in Figure 5 include ***first and second transceivers***.

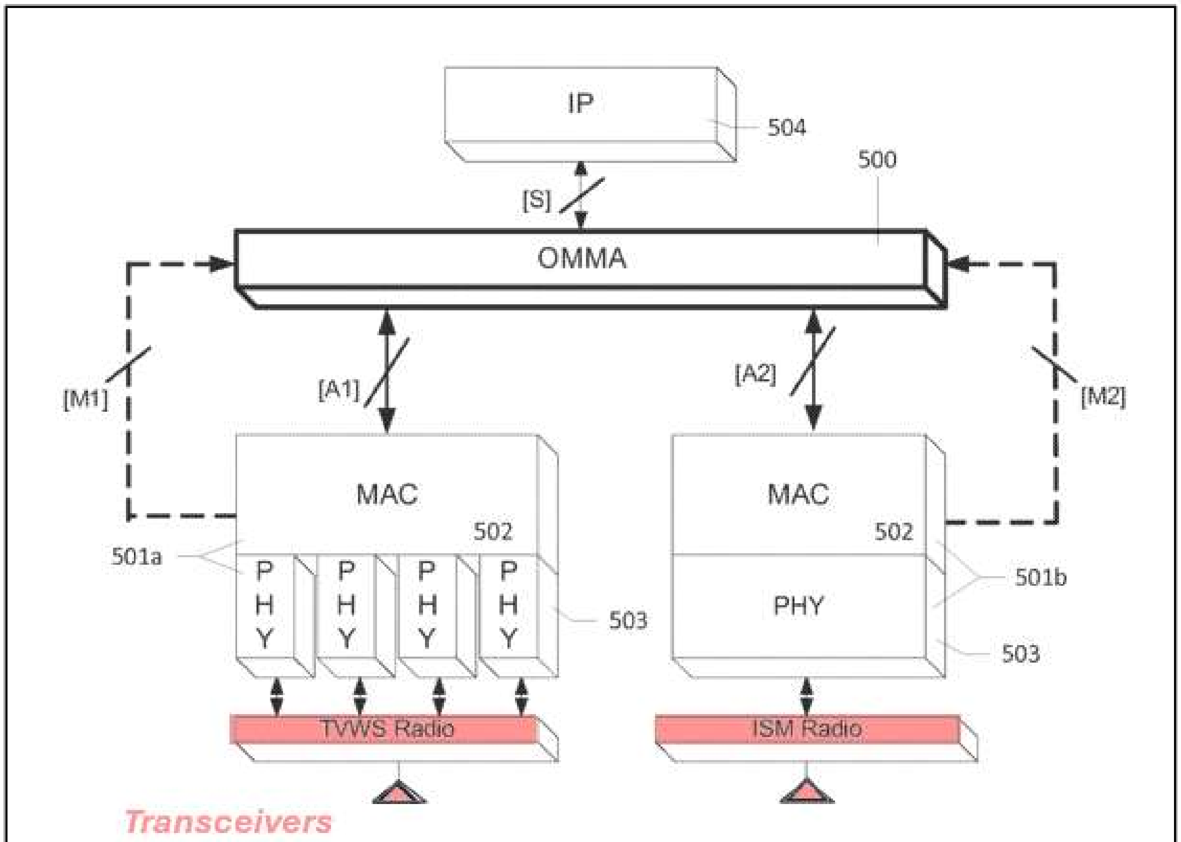


FIG. 5

A POSITA would have understood that a "transceiver" is a physical device that can both transmit and receive information. (EX1002 ¶91.) Thus, each of Chincholi's disclosed "antenna/RF front-end pairs" are a transceiver because they operate on wireless protocols that both transmit and receive data, such as IEEE802.11, IEEE802.11ac, IEEE802.11af, LTE, WCDMA, etc. (EX1005 ¶[0134].)

A POSITA would have further understood that the transceivers in Figure 5 would be associated with the actual PHY layer of each respective RAT, as the PHY layer is understood as the physical connection between a transceiver and the rest of the RAT. (EX1002 ¶92.)

Chincholi also teaches that each RAT may be implemented as a Wi-Fi RAT, and thus their associated transceivers are suitable for use in a wireless local area network. (EX1005 ¶[0134]; EX1002 ¶93.)

"the first and second wireless transceivers… respectively have first and second bandwidth availabilities up to first and second actual bandwidths": A POSITA would have recognized that each transceiver has an "actual" bandwidth (*i.e.*, total bandwidth of the transceiver) with a "bandwidth availability" that may be a subset of the actual bandwidth (*i.e.*, sub-portions of the total bandwidth that are available for use). (EX1002 ¶94.) Indeed, as Chincholi teaches, the RATs associated with each transceiver provide "meta-data feedback" allowing the OMMA layer to split IP packets amongst the RATs based on their available bandwidth. (EX1005 ¶[0138]; ¶[0161] (listing "Channel bandwidth(s)" sent by the PHY layer as an example of "feedback metric[] used by an OMMA layer"); *see also id.* ¶[0167] ("At startup, the OMMA layer may receive the ***available bandwidth of each of the one or more RATs***.").) Thus, Chincholi discloses that each of the two transceivers has a bandwidth availability up to an actual bandwidth.

"***the first and second wireless transceivers… adapted to respectively emit radio waves in first and second different bands of frequencies***"**:** Chincholi discloses that each of the transceivers may be adapted to emit radio waves in respective different bands of frequencies. (EX1002 ¶95.) In the context of Figure 4, for example, Chincholi discloses that "[f]or multiple RATs 401, ***each RAT 401 may be operating on a specific band***. For example, a 802.11n PHY/MAC operating over 2.4GHz ISM band, a 802.11af PHY/MAC operating over 512 MHz-698 MHz TVWS band, an LTE RAT operating of a licensed band (*e.g.*, 700 MHz band), a Bluetooth RAT operating on 2.4 GHz ISM band, *etc.*" (EX1005 ¶[0135].)

(f) 1[e]: wherein the processing interface comprises, at least one virtual MAC interface, at least one resource monitoring interface that, during operation of the wireless networking device, provides information regarding the first and second bandwidth availabilities to the virtual MAC interface, and

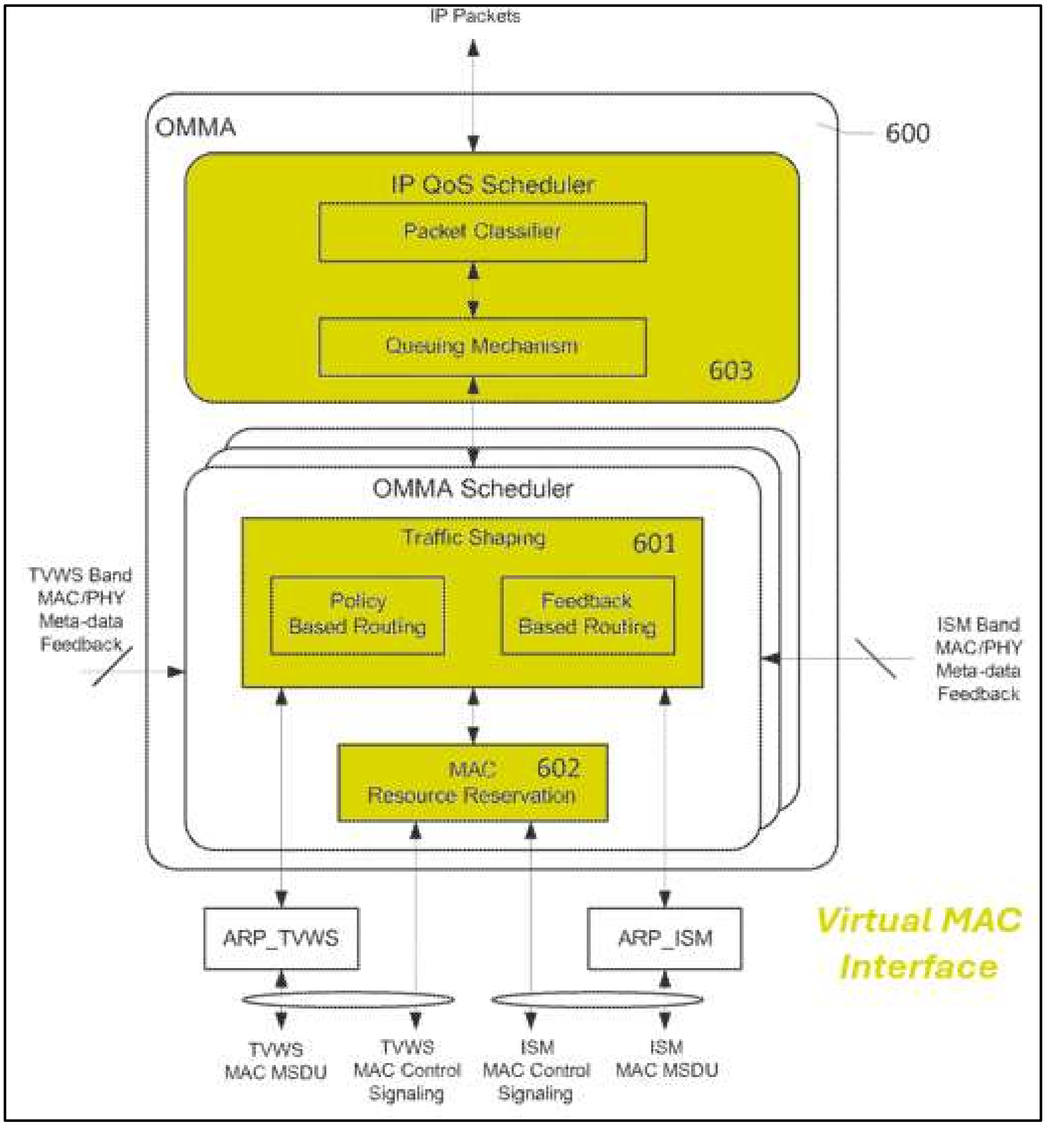
According to the '756 patent, the virtual MAC layers "enable[s] simultaneous allocation of multiple PHY resources for different signal types associated with different applications." (EX1001 at 3:52-60.) The virtual MAC layer comprises the functionality of "decision," "processing," and "ultra streaming" blocks. (EX1001 at 4:50-57.) The patent does not disclose or describe a generic "resource monitoring interface." (EX1002 ¶96.)

The patent's description of the "virtual PHY layer" provides that a virtual PHY may include multiple RF blocks, each representing the virtual use of some set of allocated transceiver resources. (EX1001 at 4:50-57; *see also* Fig. 3 (depicting two RF blocks associated with "two sets" of transceiver resources); EX1002 ¶97.) "By employing a virtual MAC and virtual PHY between an application layer and an actual MAC and PHY layer, wireless transceiver resources may be allocated more efficiently to handle various data bandwidth requirements from different applications." (EX1001 at 6:4-8.)

First, Chincholi discloses that the OMMA (*i.e.*, the processing interface) includes the claimed "***virtual MAC interface***" formed within it. Indeed, "OMMA" is an abbreviation for "opportunistic multi-medium access control ***(MAC) aggregation***," which refers to the fact that the OMMA layer aggregates multiple MAC interfaces, as depicted in Figure 5. (EX1005 ¶[0120].) The OMMA layer includes an interface acting as a "virtual MAC interface" because it transparently "distributes and/or combines" packets between the IP layer and the RATs. (EX1005 ¶[0192].) A POSITA would have recognized that this "virtualizes" a MAC interface because the OMMA would effectively appear to the IP layer as a single interface for exchanging packets that are ultimately sent or received by the actual MAC-PHY pairs. (EX1002 ¶98.)

Chincholi's OMMA layer also includes all of the functionality that the '756 patent associates with the "virtual MAC interface." (EX1002 ¶99.) Specifically, Figure 6 of Chincholi is a block diagram of an OMMA layer, comprising an IP QoS

Scheduler 603, a MAC Resource Reservation module 602, and a Traffic Shaping Module 601. (EX1005 ¶[0139].)



The IP QoS Scheduler classifies incoming packets of a packet stream, and may segregate them into distinct IP QoS streams (EX1005 ¶[0143]), which a POSITA would have recognized to fulfill the functionality of the "decision block" (EX1002 ¶100; *see also* EX1001 at 3:31-34). The MAC Resource Reservation module determines the time duration or spectral fragment/bandwidth required by a packet or set of packets (EX1005 ¶[0142]), which a POSITA would have recognized to fulfill the functionality of the "processing block" (EX1002 ¶100; *see also* EX1001 at 3:34-36). Finally, the Traffic Shaping module determines the way packets are routed across RATs using either policy based routing or feedback based routing (EX1005 ¶[0139]), which a POSITA would have recognized to fulfill the functionality of the "ultra-streaming block" (EX1002 ¶100; *see also* EX1001 at 3:36-40). Thus, a POSITA would have recognized that Chincholi's OMMA layer includes a "***virtual MAC interface***." (EX1002 ¶100.)

Second, Chincholi discloses that its processing interface comprises the "***at least one resource monitoring interface formed in the processing interface***" that, during operation, feeds information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface. A POSITA would understand that the "resource monitoring interface formed in the processing interface" requires merely a component capable of receiving feedback statistics regarding the available resources of the wireless transceivers. (EX1002 ¶101.)

Chincholi discloses the capability of receiving feedback statistics regarding the available resources of the wireless transceivers. (EX1002 ¶102.) Specifically, the traffic shaping module of the OMMA (*i.e.*, part of the "virtual MAC interface") may determine packet routing using "feedback based routing." (EX1005 ¶[0139].)

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***," *i.e.* information regarding bandwidth availabilities. (EX1005 ¶[0161].)

Figures 28, 29, and their associated descriptions describe how Chincholi collects feedback from each RAT for the traffic shaping module. (EX1002 ¶103.) Figure 28 illustrates how the OMMA layer includes an OMMA Controller, which interfaces with each RAT to collect metrics regarding the channel quality and number of resources available on the medium. Specifically, using interface A2 in Figure 28, "[a] RAT (*e.g.*, ***each RAT***) may provide feedback metrics (*e.g.*, a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller 2900 ***per device (e.g., WTRU or NT) per access category supported at that RAT***." (EX1005 ¶[0205].)

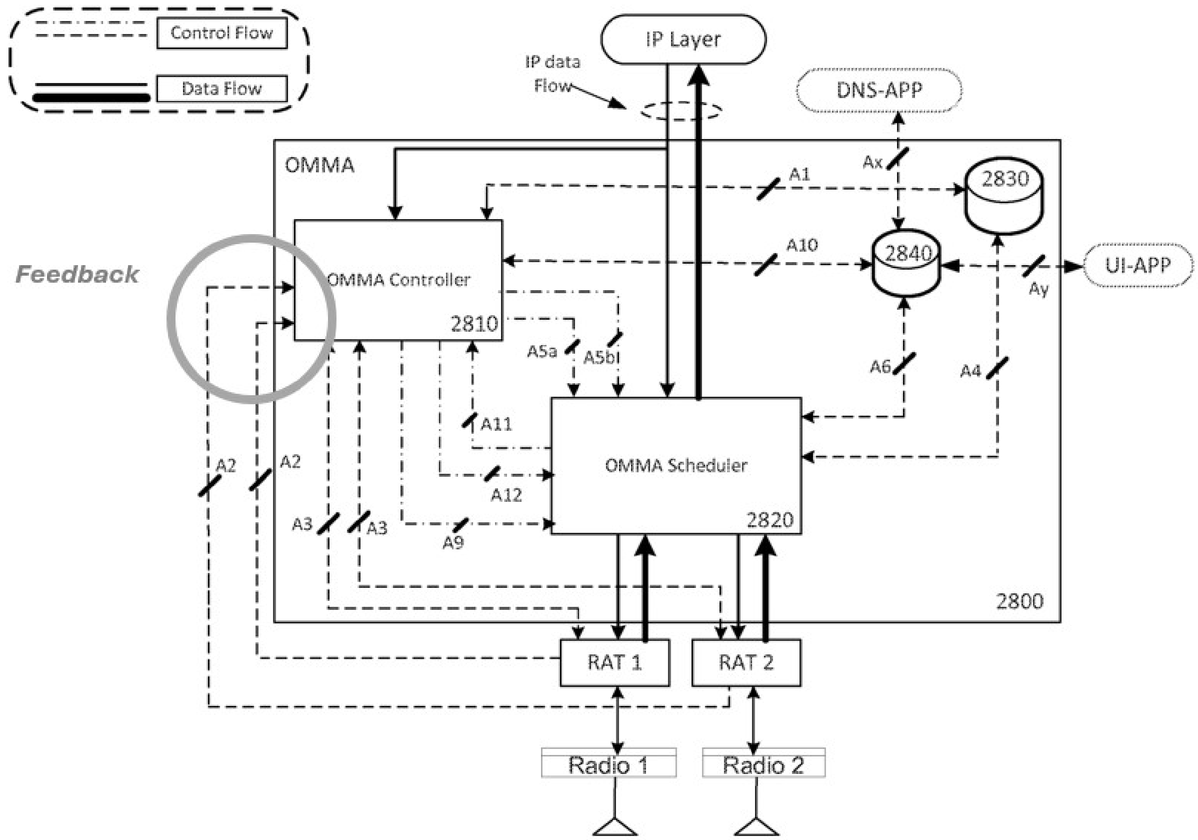


FIG. 28

The OMMA Controller includes a ***Feedback Device Classifier module 2930***. (EX1005 ¶[0205].) The Feedback Device Classifier collects information regarding the first and second transceiver resources/requirements over the "A2" interfaces in the diagram above so that this information may be provided to the OMMA Scheduler (*i.e.*, the virtual MAC interface). Specifically, "[a] RAT (*e.g.*, each RAT) may provide feedback metrics (*e.g.*, a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller 2900 ***per device (e.g., WTRU or NT) per access category supported at that RAT***." A POSITA would have recognized that the ability of the ***Feedback Device Classifier*** module of the OMMA Controller to collect feedback per device, per access category supported by each RAT discloses the "***resource monitoring interface***" as claimed by the '756 patent. (EX1002, ¶104.) The Feedback Device Classifier provides feedback, including information regarding the first and second bandwidth availabilities to the virtual MAC interface. (EX1002, ¶104.)

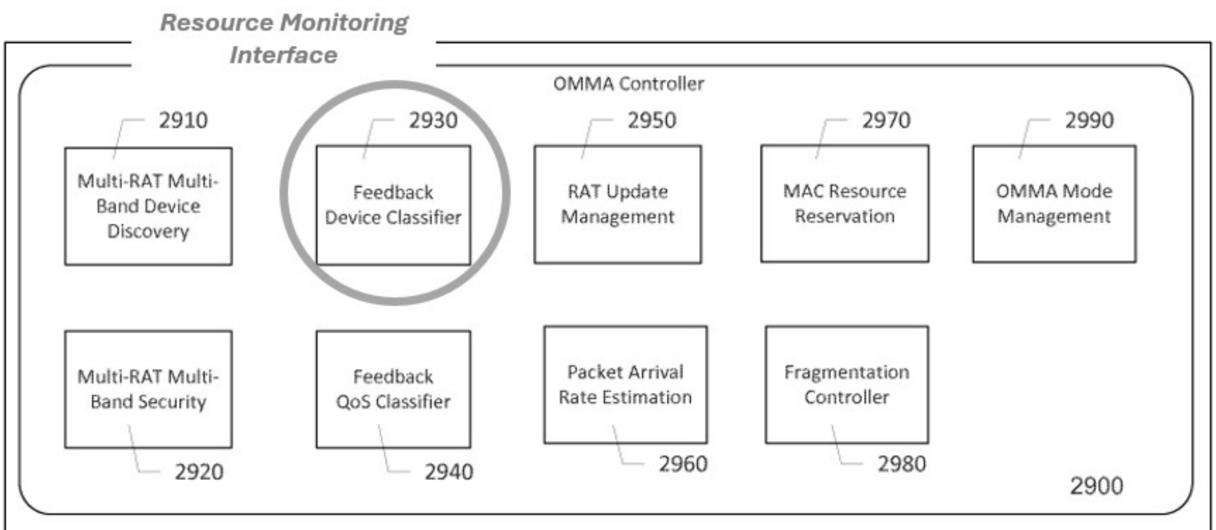


FIG. 29

(g) 1[f]: the virtual MAC interface being configured to, during use of the wireless networking device and in a manner transparent to any layer of the wireless networking device above the processing interface,

Chincholi discloses that its OMMA layer (*i.e.*, processing interface), including the virtual MAC interface, is configured to operate in a manner transparent to any higher layer. (EX1002 ¶105.) For example, Chincholi discloses that "[t]he OMMA layer ***may be transparent***, in that it distributes and/or combines packets from different RATs and forwards the packets to the IP layer." (EX1005 ¶[0192], ¶[0126].) This is as opposed to a "non-transparent" configuration in which the OMMA layer would "add[] additional headers at the transmitter, and/or reads and removes the headers at the receiver." (EX1005 ¶[0126].)

(h) 1[g]: (i) request or create a first association between a recipient and the first actual MAC and PHY interfaces and a second association between the recipient and the second actual MAC and PHY interfaces, and

Chincholi discloses techniques for network terminals and WTRUs to discover one another using active and passive scanning procedures. (EX1005 ¶[0145].) After an authentication procedure, Chincholi discloses that WTRUs may transmit a request to associate with one or more RATs of the network terminal and the network terminal may provide an association response signal accepting or rejecting the request of the WTRU. (EX1005 ¶[0149].) A POSITA would have recognized these scanning procedures disclose the ability of Chincholi's OMMA layer to request or create a first association between a recipient and the first actual MAC and PHY interfaces and a second association between the recipient and the second actual MAC and PHY interfaces. (EX1002 ¶106.)

When operating transparently with respect to higher layers, *see* limitation 1[f], Chincholi's OMMA layer handles the request/response and creation of associations with WTRUs. (EX1005 ¶[0127] ("[A]ssociation request/response frames may be updated by the OMMA layer to include OMMA device discovery parameters, for example, such as but not limited to OMMA modes, OMMA schemes, OMMA packet distribution modes, etc.”). Thus, a POSITA would have recognized that the request or creation by Chincholi’s OMMA layer of associations between recipients and the actual MAC and PHY interfaces would be performed in a manner transparent to higher level layers. (EX1002 ¶107.)

(i) 1[h]: (ii) use the information provided to it by the resource monitoring interface to make allocation decisions with respect to first and second bandwidth availabilities to at least partially satisfy the bandwidth requirement of the data stream.

Chincholi discloses that the virtual MAC interface uses feedback information to make bandwidth allocation decisions. Chincholi’s OMMA layer receives various feedback information from each RAT. (EX1005 ¶¶[0123], [205]; EX1002 ¶108.) For example, “the OMMA transmitter may use measurement metrics fed back from each RAT,” which include “channel quality metrics and the number of available resources on the medium.” (EX1005 ¶[0161].) Amongst the available resources provided as part of the feedback information are the “number of channels” and “channel bandwidth” (*i.e.*, the width of the channel, such as 20/40 MHz in the case of the ISM band). (EX1005 ¶[0161].) Table 2 of Chincholi provides examples of feedback metrics used for evaluation, including “Medium Access Delay,” “RSSI,” “Frame error rate,” “Data rate,” “Queuing latency,” and “End-to-end delay.”

(EX1005 Table 2.) As discussed in limitation 1[e], the Feedback Device Classifier (resource monitoring interface) collects information regarding the first and second transceiver resources/requirements over the "A2" interfaces so that this information may be fed back to the OMMA Scheduler.

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

3. Claim 2: The wireless networking device of claim 1, wherein the first frequency band is specified in at least one member of the family of IEEE 802.11 standards that was in existence as of Oct. 30, 2013.

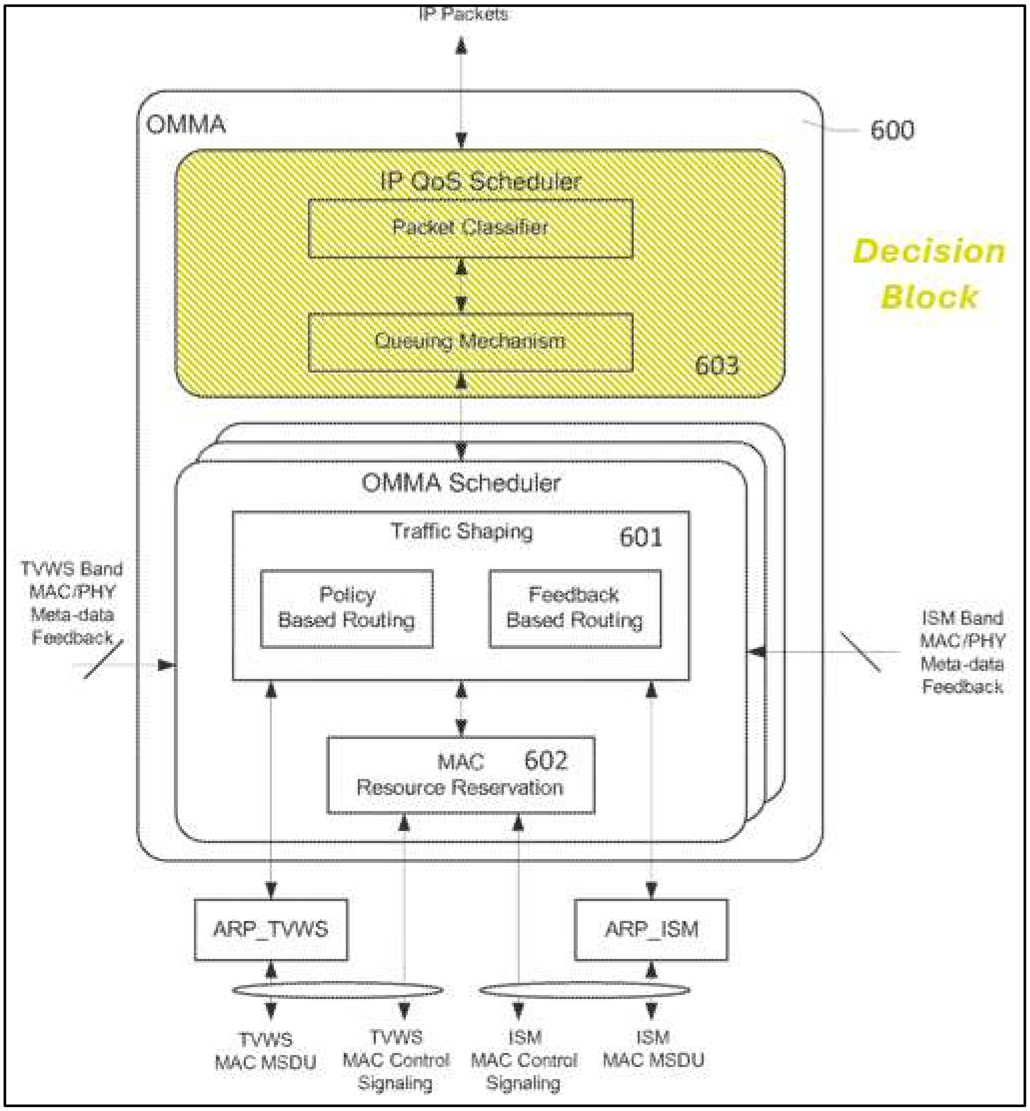
Chincholi teaches that its techniques can be used to implement an IEE 802.11 based Wi-Fi system. (EX1005 ¶[0121].) Thus, "[t]he NT 201 may operate using one flavor of the 802.11 system (*e.g.*, 11a/b/g/n) at any given time over a specific band (*e.g.*, 2.4GHz or 5GHz) when communicating with a WTRU." (EX1005 ¶[0121].) Chincholi was filed prior to October 30, 2013. Moreover, a POSITA would have recognized that the 802.11 standards expressly disclosed ("11a/b/g/n") where in existence as of October 30, 2013. (EX1002 ¶110.)

4. Claim 3: The wireless networking device of claim 1, wherein the second frequency band is specified in at least one member of the family of IEEE 802.11 standards that was in existence as of Oct. 30, 2013.

See Claim 2, supra. (EX1002 ¶111.)

5. Claim 4: The wireless networking device of claim 1, wherein the at least one virtual MAC interface includes a decision block.

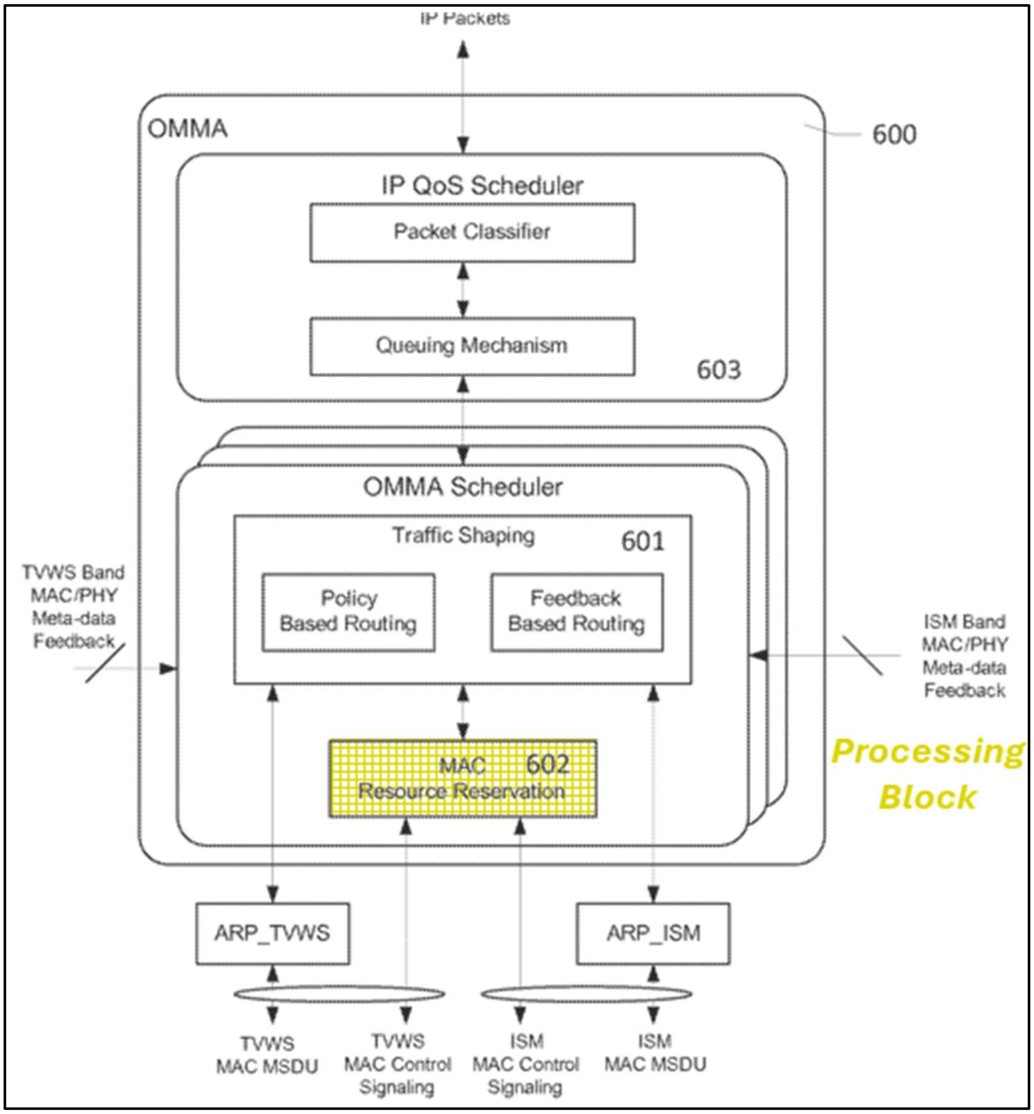
Chincholi discloses the claimed ***decision block*** in the form of the ***IP QoS Scheduler module 603***. (EX1002 ¶112.) As Chincholi teaches, "[t]he ***IP QoS Scheduler 603*** may segregate single IP packet stream comprising multiple IP QoS types into distinct IP QoS streams, for example, so that the traffic shaping module 601 may treat each IP QoS stream independently and satisfy the specific QoS requirements when routing IP packets." (EX1005 ¶[0143].)



6. **Claim 5: The wireless networking device of claim 1, wherein the at least one virtual MAC interface includes a processing block.**

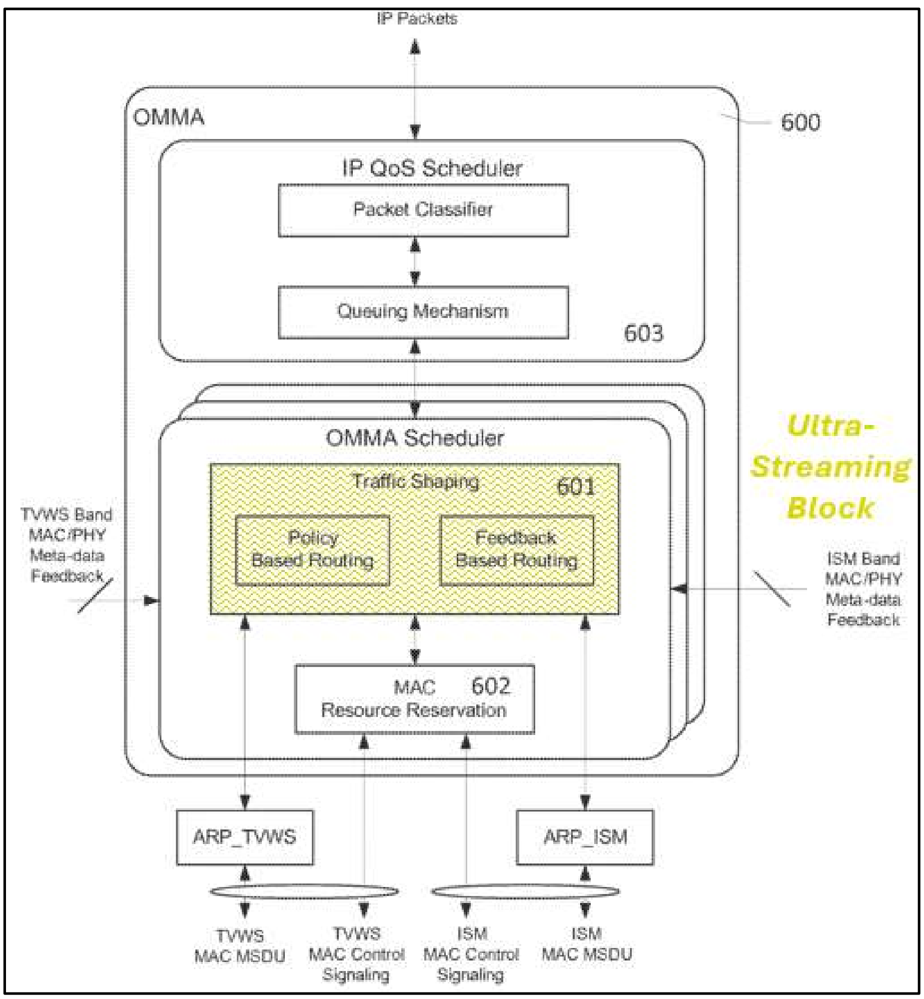
Chincholi discloses the claimed ***processing block*** in the form of the ***MAC Resource Reservation module 602***. (EX1002 ¶113.) As Chincholi teaches, "[t]he

MAC Resource Reservation module 602 may determine an amount of time duration and/or spectral fragment/bandwidth required by a packet or a set of packets. This module may transmit specific requests to the RATs over the A1/A2 interface." (EX1005 ¶[0142].)



7. Claim 6: The wireless networking device of claim 1, wherein the at least one virtual MAC interface includes an ultra-streaming block.

Chincholi discloses the claimed ***ultra-streaming block*** in the form of the ***Traffic Shaping Module 601***. (EX1002 ¶114.) As Chincholi teaches, "[t]he ***traffic shaping module 601*** may [be] responsible for determining the way packets are routed across RATs. For example, the traffic shaping module may determine the way a packet is routed using policy based routing or feedback based routing." (EX1005 ¶[0139].)



8. Claim 7: The wireless networking device of claim 1, wherein the resource monitoring interface comprises at least one RF block.

A POSITA would have understood the claimed "RF block" to merely be a component capable of receiving and reporting information about the availability of RF resources. (EX1002 ¶115.)

As discussed for limitation 1[e], Chincholi discloses that the Feedback Device Classifier Module of the OMMA Controller receives feedback metrics regarding resource availability from RATs over the "A2" interfaces so that this information may be fed back to the OMMA Scheduler. Specifically, "[a] RAT (*e.g.*, each RAT) may provide feedback metrics (*e.g.*, a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller 2900 per device (e.g., WTRU or NT) per access category supported at that RAT." Because this discloses the capability of receiving and reporting information about the availability of the transceiver resources (*i.e.*, RF resources), a POSITA would have understood the Feedback Device Classifier Module (*i.e.*, the "resource monitoring interface") to comprise at least one "RF block." (EX1002, ¶116.)

9. Claim 8: The wireless networking device of claim 1, wherein the resource monitoring interface comprises multiple RF blocks.

See Claim 7, describing how Chincholi discloses its resource monitoring interface to comprise at least one RF block. (*See also* EX1002 ¶117.) The '756 patent explains that "multiple RF blocks" "denote[s] the virtual use of [multiple] sets of allocated transceiver resources."

As shown in Figure 28, Chincholi collects feedback from ***each RAT***. (EX1002 ¶118.) Specifically, there are two interfaces A2 shown in Figure 28 correlating to RAT 1 and RAT 2—"[a] RAT (*e.g.*, ***each RAT***) may provide feedback metrics (*e.g.*, a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller 2900 ***per device (e.g., WTRU or NT) per access category supported at that RAT***." (EX1005 ¶[0205].)

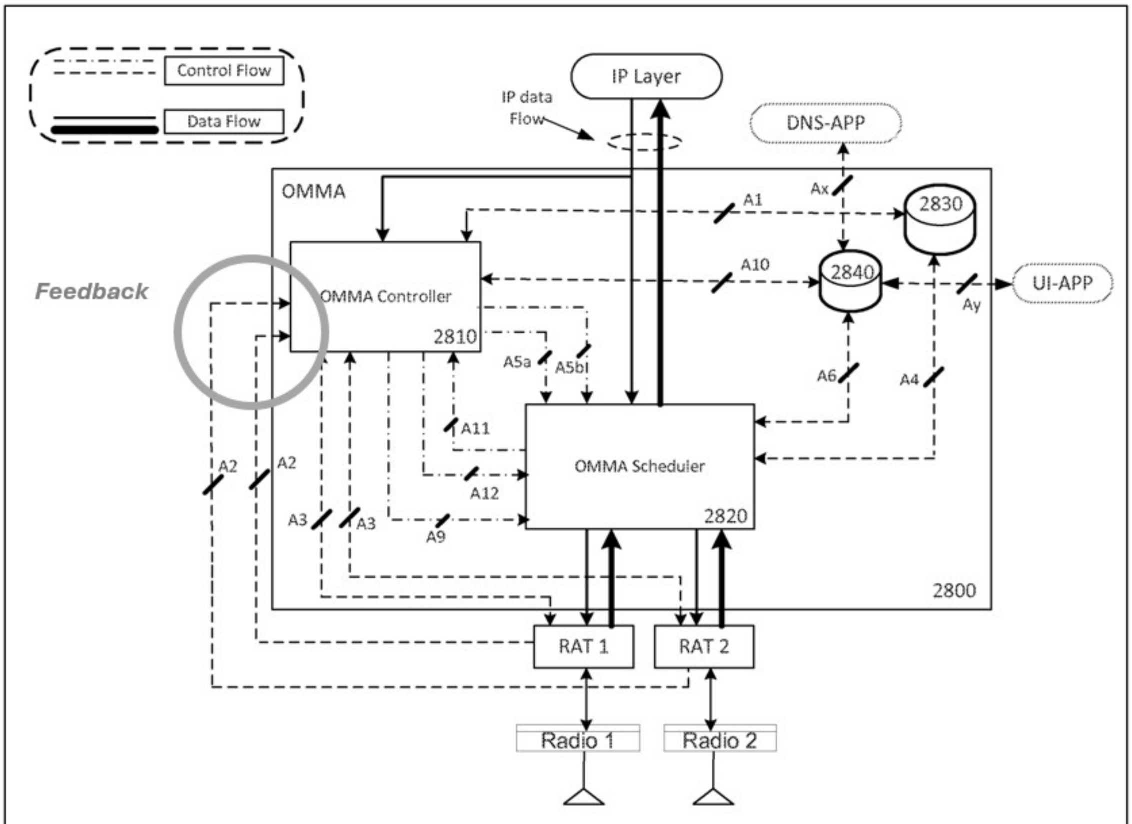


FIG. 28

The Feedback Device Classifier collects information regarding the first and second transceiver resources/requirements over the "A2" interfaces so that this information may be fed back to the OMMA Scheduler. A POSITA would have recognized that the ability of the Feedback Device Classifier module of the OMMA Controller to collect feedback per device, per access category denotes the virtual use of multiple sets of allocated transceiver resources, and thus means it comprises multiple RF blocks. (EX1002, ¶119.)

10. Claim 9: The wireless networking device of claim 1, wherein the resource monitoring interface is configured to, during use of the wireless networking device, process the data stream before it is sent to any actual MAC interface.

Chincholi discloses this limitation. (EX1002 ¶120.) Chincholi teaches that its Feedback Device Classifier module (i.e., the resource monitoring interface), in addition to collecting information regarding the first and second transceiver resources/requirements over the "A2" interfaces, "may classify the metrics for each device address… so that the OMMA controller 2900 may send feedback metrics to each device's OMMA layer… for example, through interface A5a… and/or interface A5b." (EX1005 ¶[0205]) Based on this collection and classification, the "OMMA layer may intelligently manage data traffic across multiple RATs as a function of the link quality of each RAT." (EX1005 ¶[0194].) Thus, the Feedback Device Classifier module's collection and classification of feedback information and transmission to the OMMA layer to manage the data traffic (***processing the data***

stream) is performed before being sent to the RAT for transmission (***before the data stream is sent to any actual MAC interface***).

11. Claim 10: The wireless networking device of claim 1, wherein the processing interface comprises multiple resource monitoring interfaces.

As discussed for limitation 1[e], Chincholi discloses an OMMA Controller that interfaces with each RAT on the "A2" interfaces to collect metrics regarding channel quality and resources. (EX1005 ¶[0205]; EX1002 ¶121.) The OMMA Controller comprises a ***Feedback Device Classifier module 2930***, which is a "resource monitoring interface" for collecting and analyzing this feedback information (EX1005 ¶[0205].)

A POSITA would have been motivated to implement multiple Feedback Device Classifier Modules into the OMMA Controller of Chincholi. (EX1002 ¶122.) In a multi-RAT system with groups of similarly configured RATs, a POSITA would have been motivated to implement virtualized physical interfaces, each capable of collecting and consolidating the feedback metrics for its respective grouping of similarly configured RATs. (EX1002 ¶122.) Providing this sort of virtualized physical interface for transceivers in an 802.11 system is known to be particularly beneficial as it allows an access point to accommodate communication channels with wireless devices that may operate using various different generations of the 802.11 standards. (EX1002 ¶122.) 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 ¶122.)

In implementing virtualized physical interfaces, a POSITA would recognize that each interface to a grouping of similarly configured RATs would comprise a separate, "resource monitoring interface." (EX1002, ¶123.)

12. Claim 11: The wireless networking device of claim 1, wherein the processing interface comprises multiple virtual MAC interfaces.

Chincholi discloses wireless communication systems comprising multiple base stations operating in a radio access network (RAN) that communicate with wireless devices using a multiple input, multiple output ("MIMO") architecture. (EX1005 ¶[0109]; EX1002 ¶124.) This is disclosed, for example, in Figure 1E.

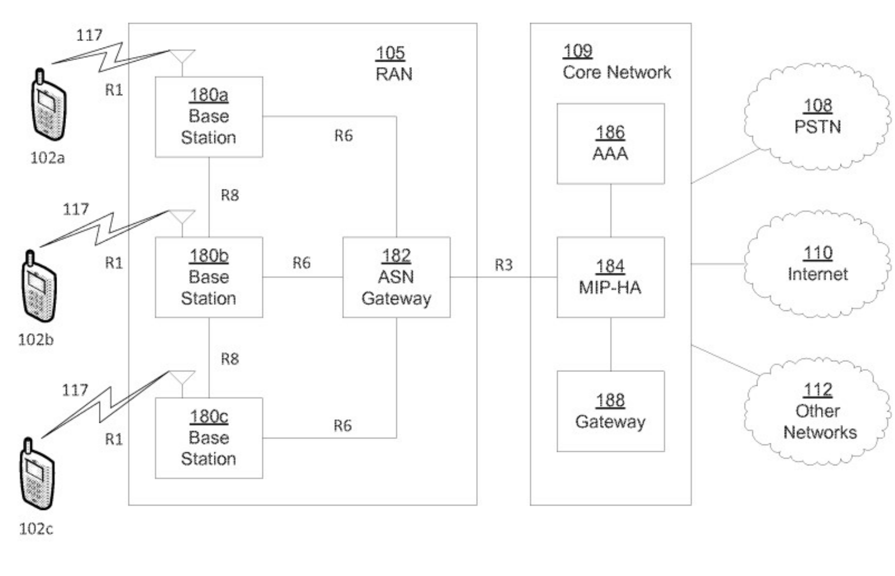


FIG. 1E

A POSITA would have recognized that each base station in Figure 1E would comprise its own OMMA layer (*i.e.*, virtual MAC interface). (EX1002 ¶125.) A POSITA would have further recognized that an additional obvious implementation would have been to combine the multiple virtual MAC interfaces of the system in Figure 1E into a single wireless communication device. (EX1002 ¶125.) Combining this functionality into a single device could, for example, leverage common hardware increasing the efficiency of a base station. (EX1002 ¶125.)

13. Claim 12: The wireless networking device of claim 1, wherein the processing interface comprises a bandwidth allocator.

A POSITA would have understood that a ***bandwidth allocator*** refers to functionality within the processing layer capable of allocating the bandwidth availabilities of multiple transceivers to meet a bandwidth requirement of one or more data streams. (EX1002 ¶126.)

Chincholi discloses the functionality of the claimed "bandwidth allocator." (EX1002 ¶127.) Specifically, Chincholi teaches that "the traffic shaping module may determine how a packet is routed using policy based routing ***or feedback based routing***." (EX1005 ¶[0139].) In feedback based routing, "the OMMA transmitter may use measurement metrics fed back from each RAT," which include "channel quality metrics and the ***number of available resources on the medium***." (EX1005 ¶[0161].) Using this feedback mechanism, the "OMMA layer may intelligently manage data traffic across multiple RATs as a function of the link quality of each RAT." (EX1005 ¶[0194].) The OMMA layer also has the capability "to readjust the assigned medium resources to a WTRU on each RAT, for example, based on global knowledge of resource assignment on other RATs." (EX1005 ¶[0196].) Thus, the "OMMA layer may utilize MAC resource reservation to achieve ***globally optimal resource allocation across RATs***." (EX1005 ¶[0196].)

From these disclosures, a POSITA would have recognized Chincholi discloses a processing layer capable of allocating the bandwidth availabilities of multiple transceivers to meet a bandwidth requirement of one or more data streams. (EX1002 ¶128.) Chincholi thus discloses a bandwidth allocator.

14. Claim 13: The wireless networking device of claim 1, wherein the resource monitoring interface is not contiguous with the virtual MAC interface.

As discussed for limitation 1[e], Chincholi's OMMA Controller includes a Feedback Device Classifier module. As shown in Figure 28, the OMMA Controller and the OMMA Scheduler are distinct blocks that communicate via control flow interfaces. A POSITA would have understood from this disclosure that the resource monitoring interface is not contiguous with the virtual MAC interface. (EX1002 ¶129.)

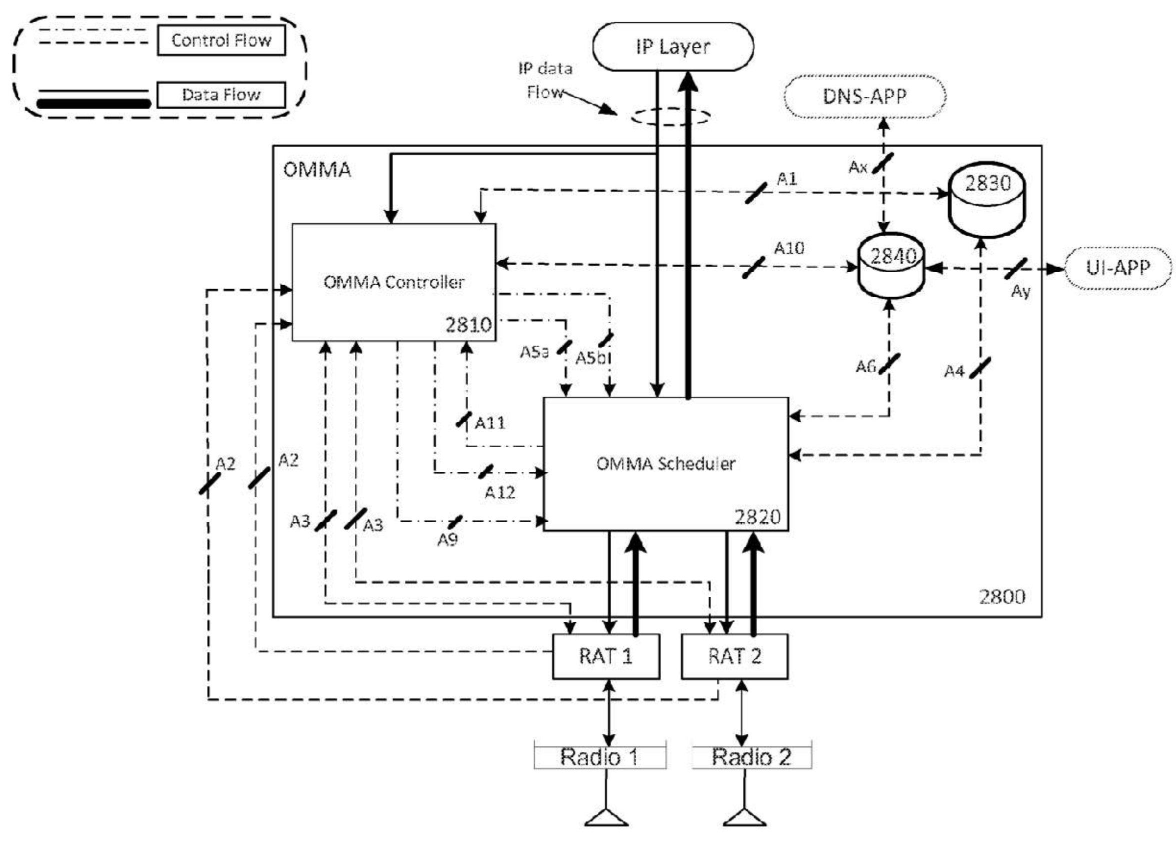


FIG. 28

15. Claim 14: The wireless networking device of claim 1, wherein the wireless networking device comprises a wireless access point.

Chincholi discloses that the wireless networking device comprises a "wireless access point." (EX1005 ¶[0002]; EX1002 ¶130.) An example of Chincholi's network terminal ("NT") is an "***access point***" (AP). (EX1005 ¶[0002].) Indeed, Chincholi discloses that a node of its wireless communication network may include a "***WiFi access point***." (EX1005 ¶[0115].)

16. Claim 15: The wireless networking device of claim 1, wherein the information provided by the resource monitoring interface to the virtual MAC interface is received by the resource monitoring interface directly from at least one of the first and second actual PHY interfaces.

See infra Claim 16, describing receiving feedback information directly from the actual MAC interfaces. While Chincholi teaches that the provision by each RAT of feedback metrics "***may*** be performed through interface A2," and thus directly from the actual MAC interfaces (EX1005 ¶[0205]), Table 2 shows that the sender of the feedback metrics may be ***either*** the actual MAC or PHY interfaces. (EX1005 ¶[0106].) Specifically, Table 2 shows that the RSSI is sent by the actual PHY interface, and that the number of channels and channel bandwidth may be sent by either the actual PHY or MAC interfaces. (*Id.*; *see also* EX1002 ¶131.)

17. Claim 16: The wireless networking device of claim 1, wherein the information provided by the resource monitoring interface to the virtual MAC interface is received by the resource monitoring interface directly from at least one of the first and second actual MAC interfaces.

As described in limitation 1[e], Figures 28, 29, and related descriptions, show how Chincholi collects feedback directly from each RAT for the traffic shaping module. (EX1002 ¶132.) Using interface A2 in Figure 28, "[a] RAT (*e.g.*, each RAT) may provide feedback metrics (*e.g.*, a vector comprising a value of serving rate, jitter, packet delay, and packet loss rate on its MAC) to the OMMA Controller

2900 per device (e.g., WTRU or NT) per access category supported at that RAT." (EX1005 ¶[0205].)

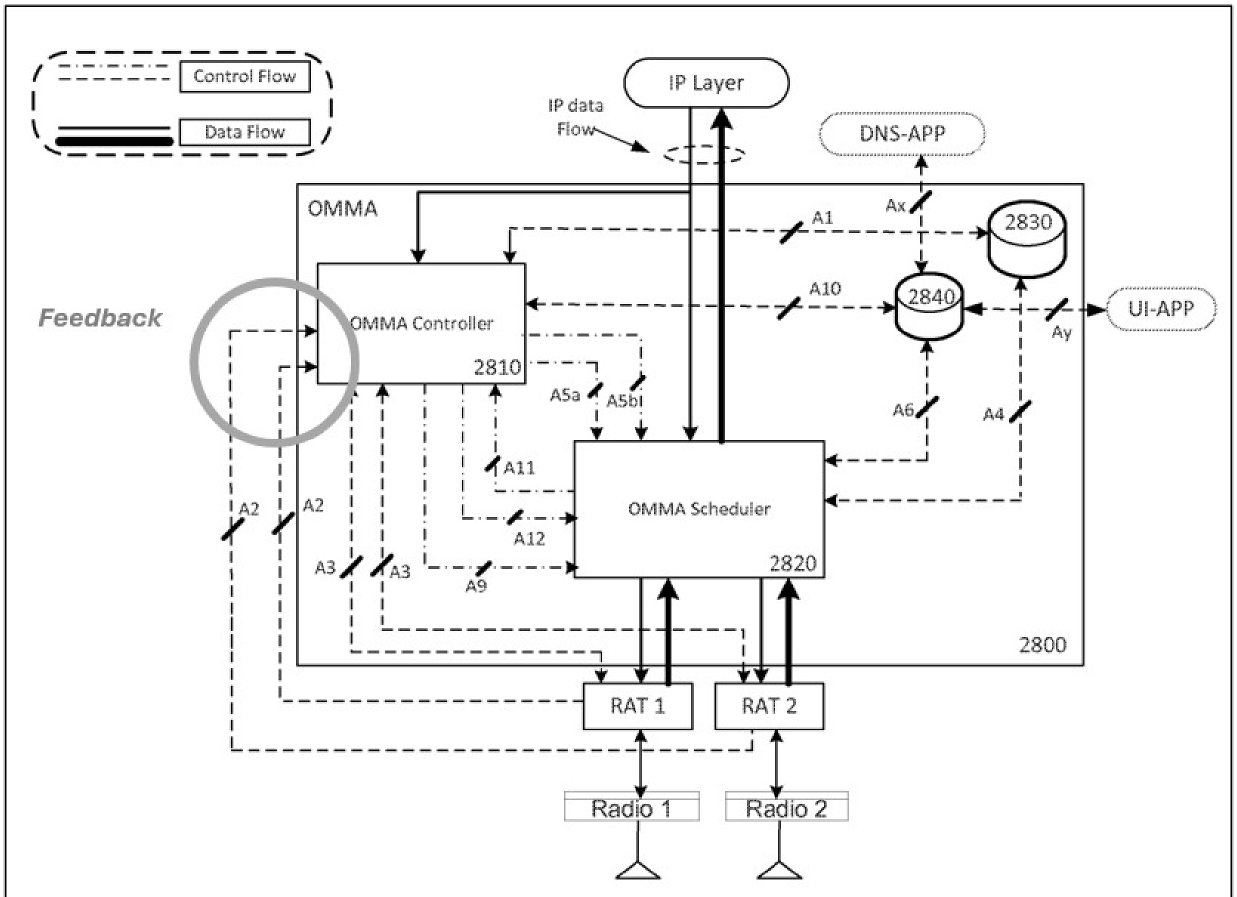


FIG. 28

The Feedback Device Classifier module (i.e. resource monitoring interface) collects information directly from each of the first and second transceiver resources/requirements over the "A2" interfaces in the diagram above so that this information may be fed back to the OMMA Scheduler. (EX1002 ¶133.) Chincholi's Figure 5 shows that the RAT-side of the "A2" interface is the ***actual MAC interfaces***:

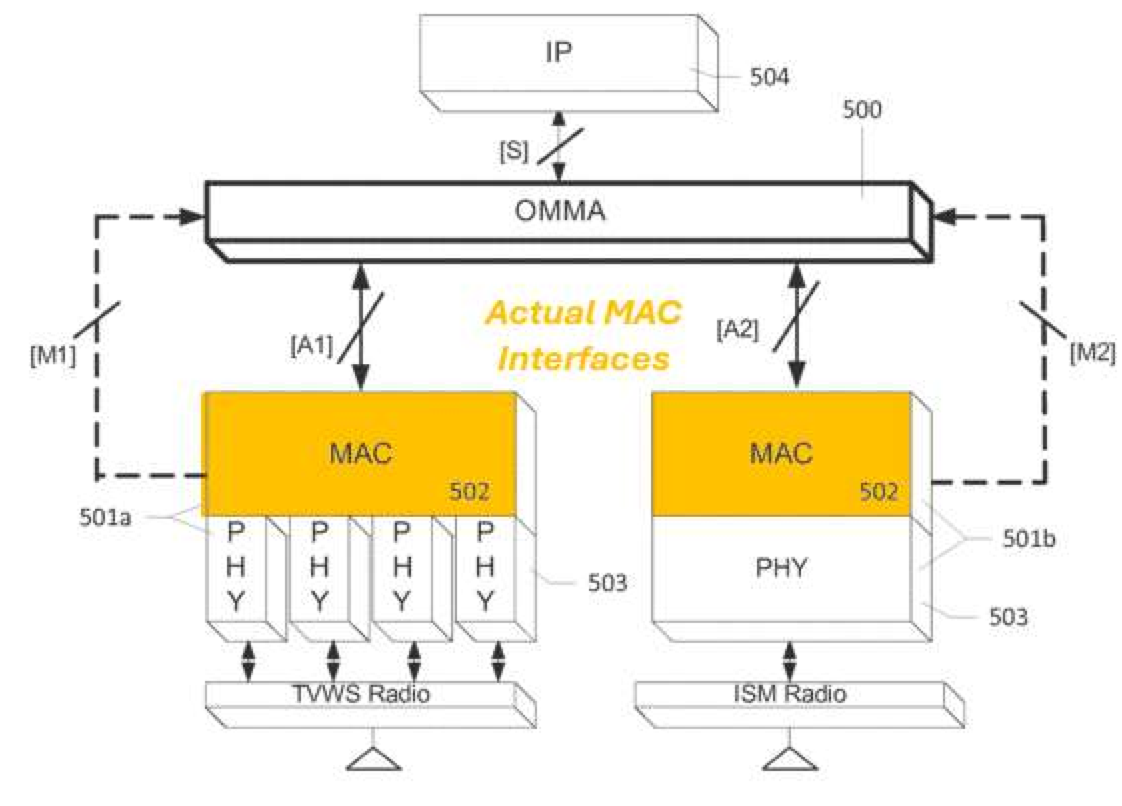


FIG. 5

See also Table 1 (describing both interface "A1" and "A2" as "Incoming/Outgoing MAC MSDUs… and MAC resource reservation control signaling"). Chincholi's Table 2 also shows that the feedback metrics may be sent by either actual MAC or PHY interfaces. (EX1005 ¶[0106])

Therefore, the information provided by the resource monitoring interface to the virtual MAC interface is received by the resource monitoring interface directly from at least one of the first and second actual MAC interfaces. (EX1002 ¶134.)

18. Claim 17: The wireless networking device of claim 1, wherein the allocation decisions involve use of at least some of the first and second bandwidth availabilities.

Chincholi discloses this limitation. (EX1002 ¶135.) As described for limitation 1[e], 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***," *i.e.* information regarding bandwidth availabilities. (EX1005 ¶[0161].) And as described in limitation 1[h], Chincholi discloses the OMMA layer allocates bandwidth resources to the transceiver resources based on this feedback information.

19. Claim 18

(a) 18[a]: The wireless networking device of claim 1, wherein the processing interface is configured to, 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,

See 1[f]. (EX1002 ¶136.)

(b) 18[b]: (i) identify at least one portion of the actual bandwidth of one of the first and second wireless transceivers, the identified bandwidth portion comprising a set of given resources, and

Chincholi teaches that NTs and WTRUs communicate with one another over "channels," which are portions of a transceiver bandwidth availability. (EX1002 ¶137.) 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]; *see also id.* ¶[0121] ("An 802.1 1 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 ¶138.) 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.e.*, the width of the channel, such as 20/40 MHz in the case of the ISM band). (EX1005 ¶[0161].)

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 of the actual bandwidth of one of the first and second wireless transceivers" (*i.e.*, available channels, or an aggregation of multiple contiguous or non-contiguous channels) of the first actual bandwidth of the first wireless transceiver. (EX1002 ¶139.)

(c) 18[c]: (ii) transmit the data stream to the recipient using only the given resources of the identified bandwidth portion that are not unavailable to thereby at least partially satisfy the bandwidth requirement.

Chincholi/Clegg disclose this limitation. (EX1002, ¶¶140-144.) A POSITA would have understood that the plain meaning of a resource being "unavailable" in the context of the '756 patent broadly includes resources that are partially or completely unavailable or that have less bandwidth availability than another resource. 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 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 ¶¶140; EX1017, Aug. 8, 2023 Applicant Remarks).

As discussed above, *see* limitation 1[e], 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].) The OMMA transmitter uses these measurement metrics fed back from each RAT for transmission. (EX1005, ¶[161].) A POSITA would have understood Chincholi's use of feedback metrics to continuously monitor available resources for transmission to disclose transmitting the data stream to the recipient using only the given resources of the identified bandwidth portion that are not unavailable. (EX1002, ¶141.)

This limitation is further taught by Clegg. (EX1002, ¶142.) 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 evaluate 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.)

A POSITA would have understood Clegg's carrier-by-carrier evaluation of interference and selection of a cluster of carriers for transmission to disclose transmission of the data stream to the recipient using only the given resources of the identified bandwidth portion that are not unavailable . (EX1002, ¶143.)

For the reasons discussed above, *see* Section VII.A, a POSITA would have been motivated to combine Clegg's teachings about how to mitigate carrier-specific interference into system of Chincholi. 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, ¶144.)

20. Claim 19

(a) 19[a]: The wireless networking device of claim 18, wherein the processing interface is configured to, 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,

See 1[f]. (EX1002 ¶145.)

(b) 19[b]: (i) evaluate at least one data transfer characteristic of a first identified bandwidth portion

of each of the first and second wireless transceivers, and

Chincholi teaches evaluation of at least one data transfer characteristic through a feedback-based routing mechanism, where "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" (***first identified bandwidth portion of each of the first and second wireless transceivers***). (EX1005 ¶[0161].) Table 2 of Chincholi provides examples of feedback metrics used for evaluation, including "Medium Access Delay," "RSSI," "Frame error rate," "Data rate," "Queuing latency," and "End-to-end delay." (EX1005 Table 2.) These metrics are all data transfer characteristics of the identified bandwidth portions of a given RAT that are evaluated by the OMMA layer. (EX1002 146.)

For example, Chincholi discloses that in a "ramp up" phase, the RSSI metric may be assumed to have converged to provide a reliable indication of the instantaneous channel quality of each RAT. (EX1005 ¶[0164].) "RSSI" stands for received signal strength and is a measure of the data transfer characteristics of the wireless transceivers associated with each RAT. (EX1002 ¶147.) Chincholi further discloses that in a "steady state" phase, all feedback metrics may be assumed to have converged to provide a reliable indication of the channel quality, including medium access delay, frame error rate, etc. (EX1005 at [0165].) Thus, in both the "ramp up" and "steady state" phases, Chincholi discloses evaluating the data transfer characteristics of the identified bandwidth portions of both the first and second transceivers. (EX1002 ¶147.)

(c) 19[c]: (ii) transmit the data stream to the recipient using the first identified bandwidth portion of either the first or second wireless transceiver based upon a comparison of the evaluated data transfer characteristics.

Chincholi discloses the OMMA layer allocates bandwidth resources to the transceiver resources for transmission based on a comparison of the evaluated data transfer characteristics. (EX1002 ¶148.) As Chincholi teaches, "the OMMA layer may determine a time duration and a bandwidth requirement for an IP flow." (EX1005 ¶[260].) 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 discloses that the OMMA layer uses feedback metrics indicating data transfer characteristics to calculate the ratio of IP packets to distribute between the first bandwidth portions of the first and second transceivers. (EX1002 ¶149.) For example, during the "ramp up" phase, Chincholi discloses the following calculation for determining the ratio:

$$\left[\frac{avg(RSSI_{ISM})}{\max(RSSI_{ISM})}\times BW_{ISM}\right]:\left[\left[\sum_{k=1}^{N}\frac{avg(RSSI_{TV}^{k})}{\max(RSSI_{TV}^{k})}\right]\times BW_{TVWS}^{k}\right].$$

(EX1005 ¶[0164].) In the "steady state" phase, Chincholi discloses the following calculation for determining the ratio:

$$\left\lceil (1 - FER_{ISM}) \times BW_{ISM} \right\rceil : \left| \left[\sum_{k=1}^{N} (1 - FER_{TVWS}^{k}) \right] \times BW_{TVWS}^{k} \right|.$$

(EX1005 ¶[0165].) A POSITA would have understood from these calculations that a higher ratio of IP packets will be allocated to the transceiver whose identified bandwidth portions have better data transfer characteristics at a given time. (EX1002 ¶149.) Further, where the data transfer characteristics of the first bandwidth portion of the first transceiver are substantially better than those of the first bandwidth portion of the second transceiver, a POSITA would have understood the capability to transmit the entire first data stream using only the first bandwidth portion of the first transceiver. (EX1002 ¶149.)

21. Claim 20: The wireless networking device of claim 19, wherein the evaluation of the at least one data transfer characteristic comprises evaluation of bandwidth unavailability.

As discussed above for limitation 18[c], Chincholi allocates IP packets between the first and second transceiver according to the available bandwidth of each transceiver and one or more metrics indicating the quality of the transceiver link. Additionally, as discussed above for limitation 18[c], Clegg discloses the capability of considering unavailable carriers within a bandwidth portion in order to more fully utilize the bandwidth availability of a transceiver. Based on these disclosures, a POSITA would have recognized that Chincholi/Clegg disclose an evaluation of the data transfer characteristics of the first and second transceivers that includes and evaluation of bandwidth unavailability. (EX1002 ¶150.)

22. Claim 21: The wireless networking device of claim 20, wherein the evaluation of the at least one data transfer characteristic comprises evaluation of bandwidth unavailability and received signal strength of at least one communication from the recipient.

As described for claim 20, Chincholi/Clegg's evaluation of the data transfer characteristics of the first and second transceivers includes an evaulation of bandwidth unavailability. Additionally, as described for limitation 19[b], Chincholi provides examples of feedback metrics used for evaluation, including "RSSI," i.e. received signal strength indication from the recipient. (EX1005 Table 2.) A POSITA would have recognized that the Chincholi/Clegg combination evaluates data transfer characteristics in terms of both bandwidth unavailability and received signal strength. (EX1002 ¶151.)

23. Claim 22: The wireless networking device of claim 18, wherein the first identified bandwidth portion of the first wireless transceiver comprises two non-contiguous portions of the bandwidth of the first wireless transceiver.

As explained for limitation 18[b], 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 ¶[0118]; *see also id.* ¶[0121] ("An 802.1 1 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***.").) A POSITA would have recognized that Chincholi therefore discloses that the first identified bandwidth portion may comprise two non-contiguous portions of bandwidth. (EX1002 ¶152.)

24. Claim 23: The wireless networking device of claim 22, wherein the first identified bandwidth portion of the second wireless transceiver comprises two non-contiguous portions of the bandwidth of the second wireless transceiver.

Claim 23 is identical to Claim 22, except it involves the second wireless transceiver rather than the first transceiver. Chincholi discloses Claim 23 for the same reasons as Claim 22. (EX1002 ¶153.)

25. Claim 24: The wireless networking device of claim 18, wherein the allocation decisions are based at least upon a signal type associated with the data stream.

Chincholi discloses this limitation. As described for limitation 1[h], Table 2 of Chincholi provides examples of feedback metrics used for evaluation and bandwidth allocation decisions. The Table 2 metrics include "MAC Type," i.e.

"CSMA/CA, OFDMA, etc.," (EX1005 ¶[0161]) which a POSITA recognizes are different ***signal types associated with the data stream.*** (EX1002 ¶154.)

Additionally, Chincholi teaches that "[t]he OMMA layer may communication with a plurality of RATs, which for example, may comprise any combination of RAT types." (EX1005 ¶[0134].) As discussed for limitation 18[c], the OMMA layer may maintain a "RAT capability database" storing the available RAT capability for an associated WTRU/NT (EX1005 ¶[0233], "continuously update" this information based on feedback metrics (EX1005 ¶[235]), and use these measurement metrics fed back from each RAT for transmission. (EX1005, ¶[161].) A POSITA recognizes that the "type of RAT (*e.g.,* LTE, 802.11n, HSPA, *etc.*)" (another ***signal type***) may be indicated in the RAT capability database. (EX1002 ¶155.)

26. Claim 25:

(a) 25[a]: The wireless networking device of claim 18, wherein the processing interface is configured to, 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,

See 1[f]. (EX1002 ¶156.)

(b) 25[b]: aggregate a first identified bandwidth portion of the first wireless transceiver with a first identified bandwidth portion of the second wireless transceiver

to at least partially satisfy the bandwidth requirement of the application.

Chincholi may "aggregate" the identified bandwidth portions of the first and second transceivers to simultaneously transmit the first data stream to the recipient to at least partially satisfy the bandwidth requirement of the application. (EX1005 ¶[0120] ("A mechanism to aggregate two or more RATs operating independently on two or more bands to enhance the total IP throughput of the link may be described herein."); EX1002 ¶157.)

Specifically, Chincholi discloses a "multiplexing mode" where, if the channel quality for one or more RATs is determined to exceed an upper threshold, the OMMA layer may transmit different independent IP packets from the same IP flow across one or more of the RATs. (EX1005 ¶[0152].) In this scenario, Chincholi is able to reserve resources (*i.e.*, a specific subset of frequencies corresponding to the identified portions of available bandwidth) of multiple transceivers and thereby aggregate the identified bandwidth portions of a first and second transceiver for simultaneous transmission. (EX1002 ¶158.)

Chincholi discloses simultaneous transmission of a first data stream using first and second transceivers. Figure 11, for example, shows how the OMMA layer splits a single IP stream of packets (*i.e.*¸ "MAC Service Data Units" or "MSDUs") for transmission across two RATs simultaneously. (EX1002 ¶159.)

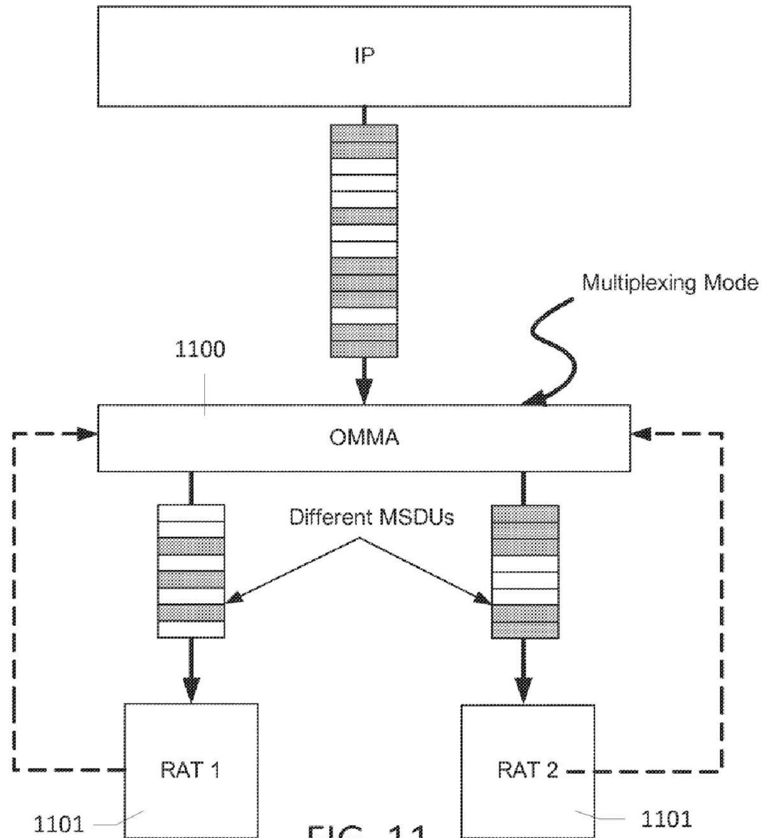


FIG. 11

As Chincholi discloses, "[u]sing multiple RATs ***simultaneously*** may provide increased bandwidth and/or increased reliability for an application." (EX1005 ¶[0194]; EX1002 ¶160.)

Chincholi discloses that the transceiver selection, data stream preparation, and simultaneous transmission is all performed by the OMMA in a manner transparent to higher levels: "[t]he OMMA layer ***may be transparent***, in that it distributes and/or combines packets from different RATs and forwards the packets to the IP layer." (EX1005 ¶[0192], ¶[0126]; EX1002 ¶161.)

27. Claim 26:

(a) 26[a]: The wireless networking device of claim 18, wherein the processing interface is configured to, 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,

See 1[f]. (EX1002 ¶162.)

(b) 26[b]: transmit the data stream to the recipient using the first wireless transceiver and to receive a second data stream that is transmitted from the recipient using the second transceiver.

A POSITA would have recognized that the ability to implement Chincholi's system to simultaneously transmit a data stream using the first transceiver and receive a second data stream from the recipient using the second transceiver. (EX1002 ¶163.)

First, in addition to enabling simultaneous transmission of an IP flow from two separate transceivers, Chincholi discloses how its OMMA layer enables aggregation of the available bandwidth on two separate transceivers to, in a manner transparent to higher layers, provide for simultaneous receipt of an IP flow. (EX1002 ¶164.) Figure 5, for example, depicts a two-way data flow between the actual MAC layer and the OMMA layer on links "A1" and "A2":

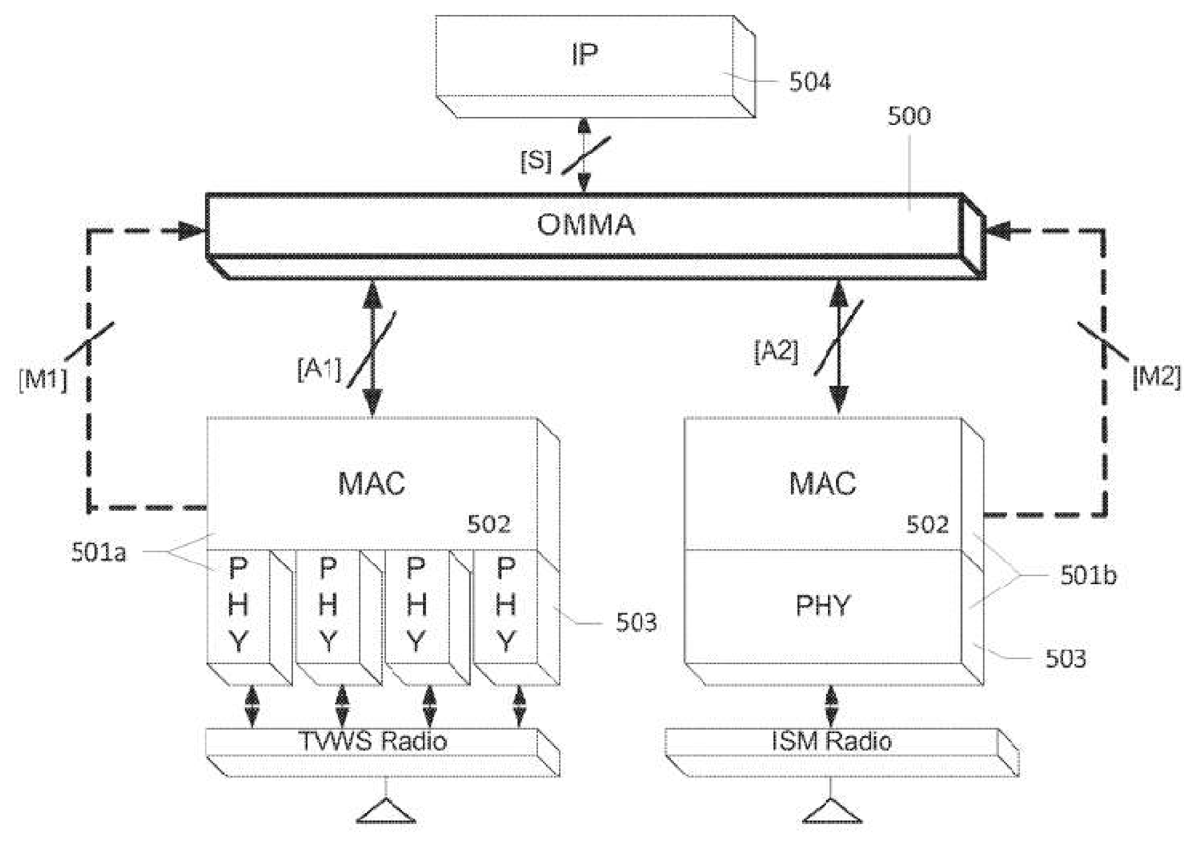


FIG. 5

Further, Table 1 of Chincholi describes the "A1" and "A2" links of Figure 5 as involving both the "Incoming" and "Outgoing" MAC MSDUs (MAC service data units). (EX1005 ¶[0138].) Indeed, Chincholi describes that the OMMA layer aggregates bandwidth across multiple RATs, in a manner transparent to higher levels, to either "distribute[]" or "***combine[]***" packets from different RATs. A POSITA would have understood that the ability of the OMMA layer to "combine" packets relates to combining simultaneously received packets across multiple RATs from a single IP flow prior to transmission up to the IP layer. (EX1002 ¶165.)

Second, because Chincholi's system is capable of implementing multiple antenna/RF pairs, each operating on a different specific frequency band (EX1005 ¶[0136]), a POSITA would recognize the ability to implement Chincholi as a simultaneous transmit and receive system. (EX1002 ¶166.)

Operating a multi-transceiver system like Chincholi to simultaneously transmit from one transceiver and receive from another was well-known and obvious to a POSITA at the time of the '756 patent. (EX1002 ¶167.) This is explained, for example, in background reference U.S. Patent 10,567,147 ("DiFazio") (EX1010). DiFazio, teaches that a "full duplex" system is one that transmits and receives the radio frequency RF signal simultaneously. (EX1010 at 1:24-26.) This is most often accomplished by implementing "frequency division duplexing (FDD) where the Tx and RX bands may be sufficiently separated in frequency such that filters can adequately attenuate any energy from the Tx signal that would leak into the Rx signal path and otherwise corrupt the Rx signal and prevent proper operation." (EX1010 at 1:26-31; *see also id.* at 16:51-67, 17:48-18:23.) Additionally, DiFazio teaches a "full duplex single channel" (FDSC) capability, wherein a base station may even simultaneously transmit and receive data streams in a single frequency channel. (EX1010 at 13:31-56.)

A POSITA would have been motivated to implement a simultaneous transmit and receive functionality into the system taught by Chincholi to achieve greater network efficiency and throughput. (EX1002 ¶168.) As DiFazio teaches, for example, the ability to simultaneously transmit and receive using FDSC can achieve 70% greater throughput as compared to conventional half-duplex systems. (EX1010 at 16:29-30.) To the extent not explicitly disclosed by Chincholi, implementing a simultaneous transmit and receive functionality into its disclosed system would have been technologically feasible and could be accomplished in straightforward manner with a reasonable expectation of success. (EX1002 ¶168.)

28. Claim 27: The wireless networking device of claim 26, wherein the transmission of the data stream from the first wireless transceiver is at least partially simultaneous with the reception of the second data stream by the second wireless transceiver.

As described for limitation 26[b], Chincholi discloses, and a POSITA would have recognized Chincholi discloses, the second data stream is received by the second transceiver simultaneously with the transmission of the first data stream from the first wireless transceiver, in light of background reference DiFazio. (EX1002 ¶169.). Therefore, Chincholi describes "at least partially simultaneous" reception and transmission.

29. Claim 28: The wireless networking device of claim 27, wherein the transmission of the data stream from the first wireless transceiver is simultaneous with the reception of the second data stream by the second wireless transceiver.

See Claim 27, describing simultaneous reception and transmission. (EX1002 ¶170.)

30. Claim 29: The wireless networking device of claim 27, wherein a first identified portion of a bandwidth availability of a third wireless transceiver is aggregated with the first identified portion of the bandwidth of the first wireless transceiver to transmit the data stream to the recipient.

Chincholi Figures 4 and 5 show at least three and up to "N" number of antenna/RF front-end pairs, and thus Chincholi discloses at least a third wireless transceiver. For example, Figure 4—a more general block diagram of the architecture set forth in Figure 5—depicts the OMMA layer existing above any number of RATs each with its own transceiver. (EX1002 ¶171.)

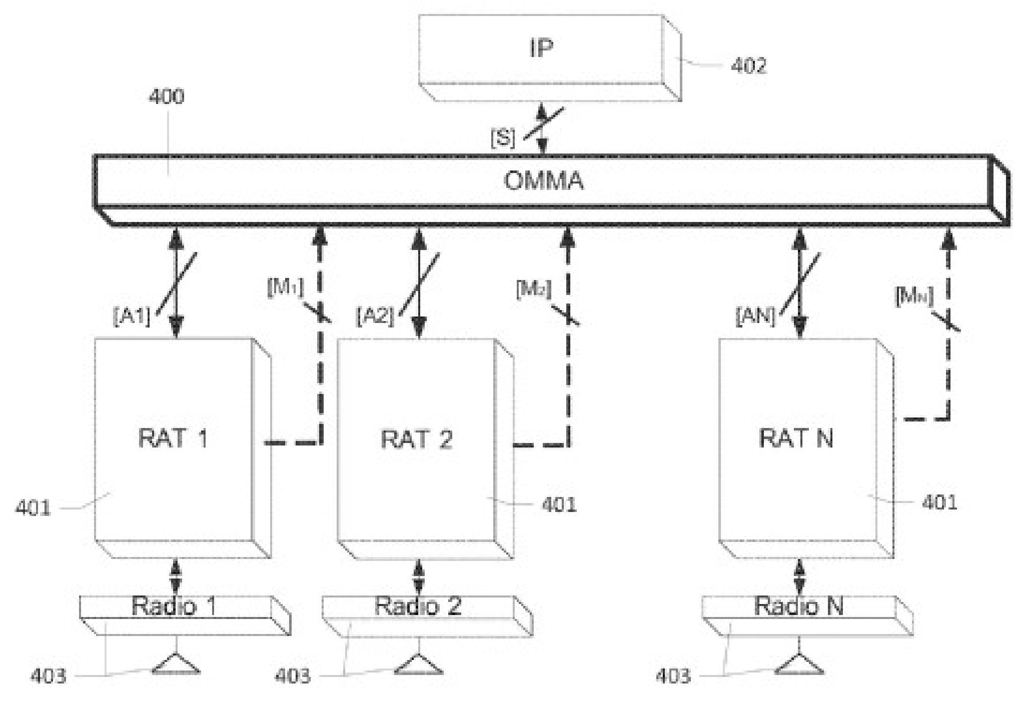


FIG. 4

Consistent with Figure 5, Chincholi explains that a given "RAT 401" can comprise a "PHY/MAC," i.e. includes an actual MAC interface. (EX1005 at [0135].)

A POSITA would have understood that in a typical 802.11 implementation, each one of the three RATs would have actual MAC and PHY interfaces. (EX1002 at ¶172.)

A POSITA would recognize from Chincholi's disclosures the ability to aggregate the bandwidth of up to three separate transceivers, with the bandwidth portions of the first and third transceivers being aggregated for simultaneous transmission of the first data stream in the manner discussed for limitation 25[b], and the bandwidth portion of the second transceiver being aggregated for simultaneous receipt of the second data stream in the manner discussed for limitation 26[b]. (EX1002 ¶173.)

31. Claim 30: The wireless networking device of claim 27, wherein a first identified portion of a bandwidth availability of a third wireless transceiver is aggregated with the first identified portion of the bandwidth of the second wireless transceiver to receive the second data stream from the recipient.

Claim 30 is identical to Claim 29, except the bandwidth portions of the first and third wireless transceivers are aggregated to receive the second data stream, rather than transmit the data stream. As described in Claim 29, Figure 5 depicts a two-way data flow (transmission or reception) between the actual MAC layer and the OMMA layer on links "A1" and "A2," and Table 1 describes the "A1" and "A2" links of Figure 5 as involving both the "Incoming" and "Outgoing" MAC MSDUs (MAC service data units). (EX1005 ¶[0138]; EX1002 ¶174.)

Thus, a POSITA would recognize from Chincholi's disclosures the ability to aggregate the bandwidth of up to three separate transceivers, with the bandwidth portions of the second and third transceivers being aggregated for simultaneous receipt of the second data stream in the manner discussed for limitation 26[b], and the bandwidth portion of the first transceiver being aggregated for simultaneous transmission of the first data stream in the manner discussed for limitation 25[b]. (EX1002 ¶175.)

B. Ground 2: Patent-Ineligible Under 35 U.S.C. §101

1. The Claims Are Directed to Patent-Ineligible Subject Matter

The PTAB uses the Supreme Court's two-part framework in *Alice Corporation v. CLS Bank International*, 573 U.S. 208 (2014), to determine patent-eligibility. PGR2023-00023-26 at 6 (Oct. 29, 2024). The PTAB must first determine what concept the claim is directed to, and if it is directed to an abstract idea, the PTAB then "must examine the elements of the claim to determine whether it contains an inventive concept sufficient to transform the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221; *see also* PGR2023-00023-26 at 7; MPEP §2106.

Turning to the first step, the Challenged Claims are directed to an abstract idea without any practical implementation details that would yield a technological innovation. At bottom, the focus of every Challenged Claim is **using feedback**

information to select available communication resources, which is abstract and patent-ineligible. *Ericsson Inc. v. TCL Commc'n Tech. Holdings Ltd.*, 955 F.3d 1317, 1327 (Fed. Cir. 2020) ("Controlling access to resources is exactly the sort of process that can be performed in the human mind, or by a human using a pen and paper, which we have repeatedly found unpatentable.").

The '756 patent asserts that prior-art wireless architectures were unable to provide adequate resources to efficiently provide optimum range and coverage for wireless network users. (EX1001 at 1:48-62.) But rather than describe a concrete, technological improvement to address this problem, the Challenged Claims recite nothing more than a bare result: use feedback information to select resources.

Claim 1, for example, boils down to the following simple requirements: a wireless device that (1) feeds bandwidth availability information of two transceivers back to a virtual MAC interface and (2) use that information to make bandwidth allocation decisions. The Federal Circuit has held that similar claims cover abstract ideas. *E.g.*, *PersonalWeb Techs. LLC v. Google LLC*, 8 F.4th 1310, 1315 (Fed. Cir. 2021) (holding abstract claims directed to "(1) using a content-based identifier generated from a 'hash or message digest function,' (2) comparing that content-based identifier against something else…; and (3) providing access to, denying access to, or deleting data"); *Intell. Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1313 (Fed. Cir. 2016) (holding abstract clams directed to (1) "creating file content IDs," (2) "determining... whether each received content identifier matches a characteristic of other identifiers," and (3) "outputting... an indication of the characteristic of the data file based on said… determining."); *see also Ericsson Inc. v. TCL Commc'n Tech. Holdings Ltd.*, 955 F.3d 1317, 1326 (Fed. Cir. 2020); *Geoscope Techs. Pte. Ltd. v. Google LLC*, No. 2024-1003, 2025 WL 1276235, at *2 (Fed. Cir. May 2, 2025).

While the Challenged Claims attempt to dress up the abstract idea with conventional features and vague, functional language, none of this is sufficient to convert the claims from the mere abstract idea into a technological improvement for implementing it. *Int'l Bus. Machines Corp. v. Zillow Grp., Inc.*, 50 F.4th 1371, 1378 (Fed. Cir. 2022) (holding ineligible claims that are "result-oriented, describing required functions (presenting, receiving, selecting, synchronizing), without explaining how to accomplish any of the tasks. The claims and specification do not disclose a technical improvement or otherwise suggest that one was achieved."). Put simply, other than requiring conventional components that make up a wireless networking device, the Challenged Claims are directed to no more than the abstract idea of collecting information (data transfer characteristics of communication resources) and analyzing that information to make a selection (from amongst communication resources).

The results-oriented claiming of the ’756 patent further demonstrates ineligibility because “a claim that merely describes an effect or result dissociated from any method by which it is accomplished is not directed to patent-eligible subject matter.” *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1244 (Fed. Cir. 2016); *see Zillow*, 50 F.4th at 1378 (holding patent directed to ineligible abstract idea because it “is result-oriented, describing required functions (presenting, receiving, selecting, synchronizing), without explaining how to accomplish any of the tasks”); *Free Stream Media Corp. v. Alphonso Inc.*, 996 F.3d 1355, 1363-64 (Fed. Cir. 2021) (holding patent directed to ineligible abstract idea because the “claims do not at all describe how [the claimed] result is achieved”); *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1167 (Fed. Cir. 2018) (A claim must “ha[ve] the specificity required to transform [the] claim from one claiming only a result to one claiming a way of achieving it.”).

The Federal Circuit has recognized that results-oriented claiming runs headlong into the preemption issue that underlies §101. *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1265 (Fed. Cir. 2016) (“[C]laims that are so result-focused, so functional, as to effectively cover any solution to an identified problem are frequently held ineligible under section 101.”) (citing *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1356 (Fed. Cir. 2016)); *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1256 n.7 (Fed. Cir. 2008) (Overbreadth and preemption effects are "inherent in open-ended functional claims, …which effectively purport to cover any and all means so long as they perform the recited functions."); *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1343 (Fed. Cir. 2018) (citation omitted) (holding that the ineligible claims "fail[] to recite a practical way of applying an underlying idea… [and] instead [a]re drafted in such a result-oriented way that they amount[] to encompassing 'the principle in the abstract' no matter how implemented")

That is the case here. Other than requiring certain well-known components in a networking device, all of the elements are results-oriented, *e.g.*: "providing" a data stream, transceivers "associated" with interfaces, "suitable for use" in a wireless network, "have" bandwidth availability, able to "emit radio waves," "providies information" to the virtual MAC interface, "in a manner transparent to any layer," "create associations," "use" information "to make allocation decisions," and "at least partially satisfy" bandwidth requirements. "[W]here, as here, the bulk of the claim provides an abstract idea, and the remaining limitations provide only necessary antecedent and subsequent components, the claim's character as a whole is directed to that abstract idea." *Ericsson*, 955 F.3d at 1326.

The '756 patent's high-level, results-oriented language seeks to encompass the abstract concept of selecting available communication resources based on feedback information, no matter how implemented. Indeed, the patent itself asserts that its invention can span multiple different types of radio access technologies (including Wi-Fi and cellular; 1:48-62), different protocols (including HDMI, MIMO, Wi-FI PHY and MAC, and IP; 4:4-14), and different types of devices (wireless access points, base stations, handhelds, tablets, computer, phones, TVs, DVD players, BluRay players, media player, storage devices, dongles, ***or any such devices***; 4:15-22). The '756 patent essentially aims to preempt the concept of selecting available communication resources based on feedback information.

The Challenged Claims are much like those found ineligible in *Two-Way Media Ltd. v. Comcast Cable Communications*, 874 F.3d 1329, 1337–38 (Fed. Cir. 2017). There, the claims recited a method for transmitting packets over a communications network by converting information streams into multiple streams of addressed digital packets, routing streams to users, controlling the routing in response to user signals, and monitoring the reception of packets. *Id.* at 1334-35. Finding that the claim merely recited "result-based functional language," the Federal Circuit held they were directed to the abstract idea of gathering and analyzing information. *Id.* at 1337-38. Here, the '756 claims similarly require nothing more than transmitting, routing, and monitoring data streams, and fail to provide specificity about how these steps are accomplished. *See also Ericsson*, 955 F.3d at 1328 (functionally-drafted claims directed to idea of controlling access to resources do not "have the specificity required to transform a claim from one claiming only a result to one claiming a way of achieving it.").

The '756 claims are also like the ineligible claims in *Rady v. Bos. Consulting*. No. 2022-2218, 2024 WL 1298742 (Fed. Cir. Mar. 27, 2024). In *Rady*, the challenged claim recited the use of "item analysis components" to gather "spectral analysis data and 3D scan data" about the unique imperfections present in physical objects, "determine" if the data was previously recorded, and then record the instance. *Id.* at *1. The Federal Circuit found that the patent did "not purport to have invented any new measurement techniques or measurement devices," did not "provid[e] any significant details regarding how these various item analysis components function," and "relie[d] on the conventional use of existing technology." *Id.* at *3-4. The Challenged Claims have the exact same shortcomings—nowhere do they purport to invent new techniques and anything that it could conceivable claim as new are simply requirements for a result (*e.g.*, in a transparent manner, "use" information "to make allocation decisions"). *Id.* at *3 ("[F]rom an eligibility perspective, the principal shortcoming in [the] claims is that they recite generic steps and results—as opposed to a specific solution to a technological problem").

Finally, neither the fact that the claims are limited to "wireless networking devices" or that they arise in the context of wireless networks is enough. *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1258–59 (Fed. Cir. 2016) (limiting field of use of the claimed invention to cellphones "does not render the claims any less abstract"); *In re TLI Commc'ns LLC Pat. Litig.*, 823 F.3d 607, 611 (Fed. Cir. 2016) ("[T]he specification makes clear that the recited physical components merely provide a generic environment in which to carry out the abstract idea"); *Ericsson*, 955 F.3d at 1327 (limiting use of idea to mobile phones is not enough). Thus, the Challenged Claims are directed to a patent-ineligible abstract idea at step one of the *Alice* analysis.

2. No "Inventive Concept" in The Claims

Where a claim is directed to an abstract idea, it must recite an "inventive concept" that "amounts to significantly more than a patent upon the [abstract idea] itself." *Alice*, 573 U.S. at 217-18. "[C]onventional, routine and well understood applications in the art" are insufficient to confer an inventive concept."); *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1378 (Fed. Cir. 2015).

Here, the Challenged Claims recite no inventive concept, let alone anything that could constitute "significantly more" than that abstract concept. The language of the Challenged Claims confirms that they merely require conventional networking components that were well-known to a POSITA, *e.g.*: a processing interface, actual and virtual MAC and PHY interfaces, and wireless transceivers. (EX1002 ¶176.) This is further demonstrated in ground 1, which demonstrates how the claims merely recite routine, conventional, and well-known components in wireless communication technology. *Sensormatic Elecs., LLC v. Wyze Labs, Inc.*, No. 2020-2320, 2021 WL 2944838, at *3 (Fed. Cir. July 14, 2021); *Riggs Tech. Holdings, LLC v. Cengage Learning, Inc.*, No. 2022-1468, 2023 WL 193162, at *3 (Fed. Cir. Jan. 17, 2023). The claims do not require any specific improvements to the existing technology involving multi-transceiver wireless communication systems. Rather, the claims simply recite generic components doing generic things. (EX1002 ¶176.)

As a further example, the claims require that the virtual MAC interface "use the information provided… by the resource monitoring interface to make allocation decisions with respect to first and second bandwidth availabilities." But it does not require a specific manner of using this information and it provides no guidance on how to do so. (EX1002 ¶177.) That does not suffice for eligibility. *Elec. Power*, 830 F.3d at 1356; *see also Alice*, 573 U.S. at 221 ("[T]ransformation into a patent-eligible application requires more than simply stat[ing] the [abstract idea] while adding the words 'apply it.'"). This same problem permeates all of the claim limitations: *e.g.*, the claim requires operation "in a manner transparent to any layer of the wireless networking device" but it does not say how to implement this transparency.

The '756 specification tacitly admits that the purported invention involves nothing more than conventional, routine and well-understood applications. (EX1002 ¶178.) For example, the claimed components and their combination (including the use of virtual MAC and PHY layers) do not confer an inventive concept because "[t]hose skilled in the art will appreciate that the [described] embodiments… enable wireless networking systems to operate at high levels of performance and with better efficiencies." EX1001 at 6:3-6; *see also* 10:51-58 (explaining POSITAs will appreciate the benefits of employing linear and radial wireless access system architectures). Accordingly, there is no inventive concept in the '756 claims that can support eligibility. *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290-91 (Fed. Cir. 2018) ("If a claim's only 'inventive concept' is the application of an abstract idea using conventional and well-understood techniques, the claim has not been transformed into a patent-eligible application of an abstract idea…. As a matter of law, narrowing or reformulating an abstract idea does not add 'significantly more' to it.").

3. The Dependent Claims Add Nothing Beyond the Abstract Idea of Claim 1

The remaining Challenged Claims are dependent upon claim 1, and likewise are directed to the abstract idea of evaluating and selecting available communication resources. They add nothing more than routine and conventional techniques such as:

- Requiring the device to be an access point (Claim 14),
- Using frequency bands specified in IEEE 802.11 (Claims 2-3),

- Using conventional functional blocks, interfaces, and components (Claims 4-8, 10-12),
- Timing of functions and position of components (Claim 9, 15-16)
- Bandwidth contiguity and availability, and other conventional information for bandwidth allocation decisions (Claims 13, 17-24), and
- Bandwidth aggregation, simultaneous transmission/receipt, and using multiple transceivers (Claims 25-30). (EX1002 ¶179.)

All of the dependent claims thus are also patent ineligible under §101. *Ameranth, Inc. v. Domino's Pizza, LLC*, 792 Fed. App'x 780, 787 (Fed. Cir. 2019) ("Dependent claims… recite limitations that do not cure the above problems…. These additional limitations in those claims are themselves routine and conventional, and thus we determine that they are also patent ineligible.").

C. Ground 3: Invalid For Lack of Written Description

1. Background

On October 29, 2013—well after the releases of 802.11 (Wi-Fi) in 1997 and 802.11n (Wi-Fi 4, which incorporated multiple-input and multiple-output ("MIMO") radio technology) in 2009—the '756 inventor filed U.S. Provisional Applications 61/897,216 ('216 Appl.) and 61/897,219 ('219 Appl.). (EX1002 ¶180.) Beginning in 2021—***eight years later*** and ***after*** the release of 802.11ac (Wi-Fi 5) and 802.11ax (Wi-Fi 6 and 6E)—the inventor started filing a slew of new non-provisional patent applications claiming priority to the '216 and '219 Applications. (EX1002 ¶180.) The '756 patent, filed in 2024, is one of the most recent of now 11 patents, spanning well over 250 claims that have been written since 2021. XiFi has asserted in the co-pending litigation that these newly-drafted claims now read upon features required by the latest version of the WiFi specification (802.11be, Wi-Fi 7). (EX1018 ¶2, ¶42; EX1002 ¶180.)

As demonstrated below, the Challenged Claims of the ’756 patent have gone far beyond the scope of the purported invention disclosed in the specification and are therefore invalid under Section 112.

2. Legal Standard

To meet 35 U.S.C. §112’s written description requirement, the specification “must describe the invention sufficiently to convey to a person of skill in the art that the patentee had possession of the claimed invention at the time of the application, i.e., that the patentee invented what is claimed.” *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005). “This requires that the written description actually or inherently disclose the claim element.” *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306 (Fed. Cir. 2008) (citations omitted and emphasis added). A patent can be held invalid for failure to meet the written description requirement based solely on the face of the patent specification. *Centocor Ortho Biotech, Inc. v. Abbott Lab’ys*, 636 F.3d 1341, 1347 (Fed. Cir. 2011). “Sufficiency of written description is a question of fact.” *In re Xencor, Inc.*, 130 F.4th 1350, 1356 (Fed. Cir. 2025).

"The purpose of the written description requirement is to ensure the scope of the right to exclude, as set forth in the claims, does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification." *ICU Med., Inc. v. Alaris Med. Sys, Inc.*, 558 F.3d 1368, 1376 (Fed. Cir. 2009) (quotation and citations omitted). Thus, a description which, in combination with knowledge in the art, merely renders a claim element obvious is not sufficient. *TurboCare Div. of Demag Delaval Turbomachinery Corp. v. Gen. Elec. Co.*, 264 F.3d 1111, 1118-20 (Fed. Cir. 2001) (holding that to comply with the written description requirement the location of the spring must be actually or inherently disclosed; that the location may be obvious from the disclosure is not enough); *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997). "The question is not whether a claimed invention is an obvious variant of that which is disclosed in the specification. Rather, a prior application itself must describe an invention, and do so in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought." *Lockwood*, 107 F.3d at 1572; *see also PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306 (Fed. Cir. 2008); *Transperfect Glob., Inc. v. Matal*, 703 F. App'x 953, 963 (Fed. Cir. 2017); *Rivera v. Int'l Trade Comm'n*, 857 F.3d 1315, 1320 (Fed. Cir. 2017).

3. Relevant Summary of ’756 Specification (EX1002 ¶¶181-183)

The ’756 patent describes an alleged problem that wireless architectures were unable to provide adequate resources to efficiently provide optimum range and coverage for wireless network users, and fail to take advantage of resources available. (EX1001 at 1:48-62.) To allegedly address this issue, the patent discloses nothing more than a conventional system comprised of results-oriented components. Specifically, it describes a wireless networking system including a “a processing layer” (*id.* 2:61), which includes a “virtual MAC layer” comprised of a “decision block,” “processing block,” and “ultra-streaming block” (*id.* 3:52-54). The patent further describes a “virtual PHY layer” that include an “RF block” (*id.* 3:54), and wireless transceivers (*id.* 2:67-3:1).

The ’756 patent describes that the decision block determines the size and type of the data stream, and the type of processing necessary to transmit it. (*id.* 3:31-37.) The processing block then processes the stream and couples to the ultra-streaming block, which manages the processing of streams and substreams given the available resources. (*id.* 3:37-43.) The ultra-streaming block also feeds data to and from the RF block, and monitors available resources. (*id.* 3:43-48.)

Neither these disclosures nor the specification conveys that the inventor had possession of the below limitations (“WD Limitations”). Indeed, as discussed above in Ground 1, the prior art disclosure of these features is far more robust than anything in the specification, which establishes that the Challenged Claims are not just obvious, but also invalid for lack of written description support. (EX1002 ¶183.)

4. Deficient Written Description Limitations ("WD Limitations")

(a) "in a manner transparent to any layer… above the processing interface" (Claims 1, 18-19, 25-26)

All Challenged Claims recite that the claimed wireless networking device must perform one or more functions "in a manner transparent to any layer… above the processing interface." The specification, however, nowhere mentions operation in a "transparent" manner as claimed—neither the word "transparent" nor any similar concept appears anywhere in the specification. (EX1002 ¶184.)

Indeed, in prosecuting an ancestor patent, Patent Owner itself could not identify anything in the common specification supporting this limitation. The limitation related to transparency first appeared during prosecution of related U.S. Patent 11,818,591 (hereafter "'591 patent") originally filed on September 7, 2021. On August 8, 2023, Applicant cancelled all originally-filed claims and added 20 new claims, including for the first time this transparency limitation. (EX1017, 8/8/2023 Claims.) Applicant "believed that the… new claims are supported by the application as originally filed," and included a chart mapping to alleged support in the specification. But nowhere did Applicant point to any disclosure related to transparency. (*Id.*, p.13-14 [pointing to the '216 provisional application's Figure 1 layer format, page 2 description about radios, and page 6 description about the RF block, but no disclosure about transparency], p.17 [pointing to the ’216 provisional application’s description about the RF block]; EX1002 ¶185.)

A POSITA reading the specification would not understand that the alleged inventor possessed the claimed wireless networking device operating in a manner transparent to any layer above the processing interface. (EX1002 ¶186.) Thus, all Challenged Claims are invalid for lack of written description support.

(b) “evaluate at least one data transfer characteristic of a first identified bandwidth portion of each of the first and second wireless transceivers, and (ii) transmit the data stream to the recipient using the first identified bandwidth portion of either the first or second wireless transceiver based upon a comparison of the evaluated data transfer characteristics” (Claim 19)

Claim 19 requires evaluation of the data transfer characteristics of a bandwidth portion of each of the wireless transceivers, and compare the evaluated data transfer characteristics for the data stream transmission. Nowhere in the specification is there any description about data transfer characteristics, any evaluation of such data transfer characteristics, or any use of such evaluation to transmit the data stream. Indeed, the written description of the ’756 patent never even mentions data transfer characteristics or any relative evaluation of bandwidth portions. (EX1002 ¶187.)

The limitations related to data transfer characteristics appeared in the ’756 patent family for the first time in the December 7, 2023 patent application that would later issue as the ’105 patent. The Examiner issued a notice of allowance for the ’105 patent without any office action or expressly analyzing whether the applied-for claims were supported by the ’216 and ’219 provisional applications. (EX1002 ¶188.)

While the ’756 specification makes some passing references to data transfer cycles (EX1001 at 3:12-14), data transfer rates (3:26, 8:13-14), data transfer capability (4:2, 8:59), data transfer efficiency (5:53), and data transfer optimization by controlling link transmit and receive times (6:12-14), it never discusses any evaluation of data transfer ***characteristics***, and—more importantly—never explains how or what it means to ***evaluate*** data transfer characteristics and ***compare*** them. Indeed, the focus of the ’756 specification is not on transfer characteristics, but on bandwidth requirements and availability. (*E.g.*, *id.* 3:24-26 (“The individual applications, for example, may have different peak bandwidth requirements in terms of data transfer rates”).) Accordingly, a POSITA reading the specification would not understand that the alleged inventor possessed the claimed wireless networking device including evaluation of data transfer characteristics. (EX1002 ¶189.)

(c) "resource monitoring interface" (Claims 1, 7-10, 13, 15-16)

Claim 1 of the '756 requires the processing interface comprise at least one "resource monitoring interface" that provides information regarding the bandwidth availabilities of the transceivers to the virtual MAC interface. The '756 specification nowhere describes a resource monitoring interface. While the specification describes a virtual PHY layer formed by RF block 112 (3:54), which communicates with the ultra-streaming block about actual resource availability (4:54-63), a generic resource monitoring interface is a broader element that is not supported by mere description of virtual PHY layers. (EX1002 ¶190.) Thus, the '756 patent fails to provide adequate written description support for this limitation because it does not convey to POSITA that the patentee had possession of the ***full scope*** of the claimed invention. *See ICU Med.*, 558 F.3d at 1378 (holding that specification teaching a medical device with a spike failed to support claims for a more generic device without a spike); *Chiron Corp. v. Genentech, Inc.*, 363 F.3d 1247, 1259 (Fed. Cir. 2004) (holding that written description requirement requires sufficient disclosure to show "the inventor actually ***invented the full scope of the invention*** as finally claimed in the patent") (emphasis added). A POSITA reading the specification would not understand that the alleged inventor possessed the claimed wireless networking device comprising a resource monitoring interface. (EX1002 ¶190.)

(d) "the first and second wireless transceivers… are adapted to respectively emit radio waves in first and second different bands of frequencies" (Claim 1)

The '756 patent specification fails to provide written description support for the first and second wireless transceivers respectively adapted to emit radio waves in first and second ***different*** bands of frequencies. Nowhere does the specification describe one transceiver operating in one band of frequency and another transceiver operating in a mutually exclusive, different one. Indeed, nowhere in the specification does it even use the word "***band***" or even discuss the allocation of frequency spectrum to the respective transceivers. (EX1002 ¶191.)

Patent Owner touts this limitation of using multiple frequency bands, an aspect of multilink operation, as a novel feature in its complaint in the district court case. EX1018 ¶2 ("The claimed inventions enable Samsung to offer superior devices that perform multi-link WiFi operations"), ¶40 ("The XiFi Patents further allow Multi-Link Operation (MLO), which is a significant aspect of Wi-Fi 7. MLO-enabled Wi-Fi 7 devices minimize the significant overhead of switching bands."). But nowhere in the '756 specification is this concept even remotely mentioned. (EX1002 ¶192.)

A POSITA reading the specification would not understand that the alleged inventor possessed the claimed wireless networking device wherein the first and second wireless transceivers, respectively, are adapted to emit radio waves in first and second different bands of frequencies. (EX1002 ¶193.)

(e) "request or create a first association between a recipient and the first actual MAC and PHY interfaces and a second association between the recipient and the second actual MAC and PHY interfaces…" (Claim 1)

The '756 patent specification fails to provide written description support for requesting or creating ***associations*** between a recipient and MAC and PHY interfaces. (EX1002 ¶194.)

Limitations regarding "association" between a recipient and MAC and PHY interfaces first appeared in the '756 patent family during the prosecution of the application that later issued as the '591 patent in an August 8, 2023 amendment. Applicant claimed that there was support in the '216 provisional application. Specifically, Applicant cited a portion at page 6 of the '216 provisional that mentions that an RF block (part of the virtual PHY interface) communicates with the ultra-streaming block (part of the virtual MAC interface), and Figure 1 that shows that the actual PHY layers each contains a radio. (EX1017, 8/8/23 Claims, p.14.) Applicant claimed that this was enough to "indicate, for example, that the processing interface creates an association between a recipient and each one of the… MAC and PHY layers." (*Id.*; EX1002 ¶195.)

The cited portions of the provisional applications identified by applicant during prosecution do not indicate to a POSITA possession of the claim limitation. (EX1002 ¶196.) Nowhere do the provisional applications explain what the recipient is, or disclose any process of creating an association between the network device's MAC and PHY interfaces and a recipient. The fact that the PHY layers contain radios does not expressly or inherently explain creating associations as claimed. Indeed, radios can broadcast information without making links or associations with recipients. (EX1002 ¶196)

A POSITA reading the specification would not understand that the alleged inventor possessed the claimed wireless networking device comprising a processing interface configured to 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. (EX1002 ¶197.)

D. Ground 4: Indefiniteness

A patent claim is "invalid for indefiniteness if its language, when read in light of the specification and the prosecution history, 'fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention.'" *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1369-70 (Fed. Cir. 2014) (citing *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014)). Merely being able to ascribe "some meaning" to a patent's claims is insufficient to satisfy the definiteness requirement of 35 U.S.C. § 112. *Nautilus*, 572 U.S. at 911 (2014).

1. "partially simultaneously" (Claim 27)

The term "partially simultaneously" is indefinite because it is a term of degree, and the patent fails to provide sufficient guidance for determining their scope.[3] When a claim uses a term of degree, the intrinsic record must provide "objective boundaries" sufficient to allow POSITAs to discern the scope of the claim with "reasonable certainty." *Interval Licensing*, 766 F.3d at 1370-74; *see also Berkheimer v. HP Inc.*, 881 F.3d 1360, 1364 (Fed. Cir. 2018) (Federal Circuit "case law is clear that the objective boundaries requirement applies to terms of degree."). Claim 27 is particularly problematic because it involves one term of degree ("partially") upon another potential term of degree ("simultaneous") compounding uncertainty to a POSITA. (EX1002 ¶¶198-200.)

Here, nothing in the claims or intrinsic record provide guidance regarding what degree of simultaneity qualifies as "partially" simultaneous. For example, it is not clear whether transmission or receipt of a data stream within one microsecond,

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[3] This is consistent with Samsung's obviousness ground because Chincholi discloses simultaneous transmission and receipt, thus meeting any degree of "partially" simultaneous.

millisecond, second, or minute is within the scope of "partially" simultaneous or simultaneous (as used in Claim 28). (EX1002 ¶199.) It is entirely unclear whether the claimed simultaneity/partial simultaneity requires simultaneity with respect to the beginning of transmission/receipt of two data streams, simultaneity with respect to the end of transmission/receipt of two data stream, or requires perfect overlap between the duration of two data streams. (EX1002 ¶199.) Because the '756 patent recites both "partially simultaneous" and "simultaneous," there must be a difference between the two terms. But the specification the fails to provide any objective guidance to understand what would be "partially" simultaneous compared to "simultaneous." *See In re Taasera Licensing LLC, Pat. Litig.*, No. 22-MD-03042, 2023 WL 8628323, at *20 (E.D. Tex. Dec. 13, 2023).

2. "partially satisfy" (Claims 1, 18, 25)

The term "partially satisfy" is indefinite because it is a term of degree, and the patent fails to provide sufficient guidance for determining its scope.[4] (EX1002 ¶¶201-202.) When a claim uses a term of degree, the intrinsic record must provide "objective boundaries" sufficient to allow POSITAs to discern the scope of the claim

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[4] This is consistent with Samsung's obviousness ground because Chincholi discloses fully satisfying the bandwidth requirement of the applications, and fully satisfying the bandwidth requirement encompasses "partially satisfying."

with "reasonable certainty." *Interval Licensing*, 766 F.3d at 1370-74; *see also Berkheimer*, 881 F.3d at 1364.

Here, nothing in the claims or intrinsic record provide guidance regarding what qualifies as "partially" satisfying the bandwidth requirement of a data stream. For example, for an application with a peak bandwidth requirement of 750 Mbps, it is not clear whether aggregating bandwidth portions of two transceivers to allocate 1, 5, or 10 Mbps would qualify as "partially" satisfying the bandwidth requirement of the data stream. (EX1002 ¶201.) Additionally the specification discusses only situations that *satisfy* the bandwidth requirement, never *partially*. (*See, e.g.*, EX1001 at 2:56-57, 4:31-32, 4:48-49). Indeed, within the context of the claims, a POSITA would not understand what it would mean to "partially" satisfy a bandwidth requirement, as it implies a system that may allocate bandwidth portions of multiple transceivers yet still fall short of satisfying the peak bandwidth requirement of the application by some indeterminate amount. (EX1002 ¶201.) Thus, the specification fails to provide any objective guidance to understand how far short the system can fall from satisfying the application bandwidth requirement while still falling within the scope of "partially satisfying" the requirement. *See In re Taasera*, No. 22-MD-03042, 2023 WL 8628323, at *20.

VIII. CONCLUSION

For at least the foregoing reasons, this Petition should be instituted.

Date: July 21, 2025

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CERTIFICATE OF COMPLIANCE

Under the provisions of 37 C.F.R. § 42.24, the undersigned hereby certifies that the word count for the foregoing Petition for post grant review (excluding the table of contents, table of authorities, mandatory notices, certificate of service or word count, and appendix of exhibits or claim listing) totals 15,772 words, which is within the word limit allowed under 37 C.F.R. § 42.24(a)(ii).

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e), 42.205, the undersigned hereby certifies service on the Patent Owner of a copy of this Petition and its respective exhibits at the official correspondence address for the attorneys of record for the ’756 patent as shown in USPTO PAIR via FedEx:

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