

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioners,

v.

XIFI NETWORKS R&D, INC.,
Patent Owner.

Case PGR2025-00067

Patent 12,190,198

**PATENT OWNER'S RESPONSE
UNDER 37 C.F.R. § 42.220**

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Patent Owner Exhibit List

Exhibit No.	Description
EX2001	Complaint, <i>XiFi Networks R&D, Inc. v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.</i> , No. 2:24-cv-01057-JRG, Dkt. 1 (E.D. Tex. Dec. 17, 2024).
EX2002	First Amended Docket Control Order, <i>XiFi Networks R&D, Inc. v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.</i> , No. 2:24-cv-01057-JRG, Dkt. 28 (E.D. Tex. Apr. 14, 2025).
EX2003	Plaintiff's First Amended Complaint, <i>XiFi Networks R&D, Inc. v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.</i> , No. 2:24-cv-01057-JRG, Dkt. 13 (E.D. Tex. Mar. 11, 2025).
EX2004	Defendants' Answer and Affirmative Defenses to Plaintiff's First Amended Complaint, <i>XiFi Networks R&D, Inc. v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.</i> , No. 2:24-cv-01057-JRG, Dkt. 31 (E.D. Tex. Jun. 9, 2025).
EX2005	Defendants' P.R 3.3 and 3.4 Invalidity Contentions (Jun. 18, 2025).
EX2006	Table 1 Comparing Select Sections of Almeroth Declaration to Corresponding Sections of Petition (EX1002).
EX2007	[RESERVED]
EX2008	Declaration of Dr. Robert Akl, D.Sc.
EX2009	American Heritage Dictionary (5th Ed., 2012).
EX2010	Andrew S. Tanenbaum, <i>Computer Networks</i> (5th Ed., 2011).
EX2011	U.S. Patent No. 8,078,208
EX2012	U.S. Patent No. 9,560,656
EX2013	Curriculum Vitae of Dr. Robert Akl, D.Sc.

Exhibit No.	Description
EX2014	Excerpts from the prosecution history of U.S. Patent No. 11,950,105
EX2015	Excerpts from the prosecution history of U.S. Patent No. 12,169,756
EX2016	Excerpts from the prosecution history of U.S. Patent No. 12,250,564
EX2017	Second Declaration of Dr. Robert Akl, D.Sc.
EX2018	Further excerpts from Andrew S. Tanenbaum, <i>Computer Networks</i> (5th Ed., 2011).
EX2019	International Organization for Standardization and the International Electrotechnical Commission, ISO/IEC 7498-1, Information technology—Open Systems Interconnection—Basic Reference Model: The Basic Model (2d. Ed. corrected and reprinted 1996)
EX2020	Amended Joint Claim Construction Statement, <i>XiFi Networks R&D, Inc. v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.</i> , No. 2:24-cv-01057-JRG, Dkt. 62 (E.D. Tex. Feb 27, 2026).
EX2021	Declaration of Dr. Mark Mahon in Support of Claim Construction, <i>XiFi Networks R&D, Inc. v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.</i> , No. 2:24-cv-01057-JRG
EX2022	Excerpts from the file history of U.S. Patent No. 11,818,591
EX2023	Excerpts from the file history of U.S. Patent No. 11,950,105
EX2024	Excerpts from the file history of U.S. Patent No. 11,849,337
EX2025	Excerpts from the file history of U.S. Patent No. 11,856,414
EX2026	Excerpts from the file history of U.S. Patent No. 12,169,756
EX2027	Excerpts from the file history of U.S. Patent No. 12,114,177

Exhibit No.	Description
EX2028	Excerpts from the file history of U.S. Patent No. 12,250,564
EX2029	Excerpts from the file history of U.S. Patent No. 11,974,143
EX2030	Transcript of the Deposition of Dr. Mark Mahon, <i>XiFi Networks R&D, Inc. v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.</i> , No. 2:24-cv-01057-JRG
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EX2032	Curriculum Vitae of Dr. Robert Akl, D.Sc.

I. SUMMARY OF ARGUMENT IN LIGHT OF POST-INSTITUTION DEVELOPMENTS

Pursuant to 37 C.F.R. § 42.220, Patent Owner XiFi Networks R&D, Inc. (“XiFi”) submits this Response to the Petition for Post Grant Review (“PGR”) of U.S. Patent No. 12,190,198 (the “’198 patent”). Paper 3 (“Petition”). Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Petitioners”) challenge the validity of claims 1-30 of the ’198 patent on the grounds that these claims are obvious, in violation of 35 U.S.C. § 103, in light of a combination consisting of: International Application WO 2013/126859 (“Chincholi”) (EX1005) and U.S. Patent No. 9,055,592 (“Clegg”) (EX1009), collectively, “Ground 1.” Petitioners further challenge claims 1-30 of the ’198 patent on the grounds that the claims are: patent-ineligible under 35 U.S.C. § 101 (Ground 2); lack adequate written description under 35 U.S.C. § 112 ¶1 (Ground 3); and are indefinite under 35 U.S.C. § 112 ¶2 (Ground 4).

Patent Owner filed a Preliminary Patent Owner Response (“POPR”), which included the argument, among others, that Petitioners’ evidence failed to show the claimed “‘virtual’ MAC interface, properly understood.” Paper 11. This body nonetheless instituted trial via an order that did not contain reasoning. Paper 13.

Since institution, the record has developed in multiple ways that weigh in favor of denying the Petition. Importantly, in the co-pending district court action, Petitioners have advanced six narrowing constructions, contrary to the positions they

took in the Petition, which were based on a broader plain-and-ordinary-meaning analysis. For this procedural reason, the Petition should be terminated under 37 C.F.R. § 42.204(b)(3) and the precedential decision *Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 20 at 5 (November 3, 2025) (precedential). *See* Parts III & V.

Moreover, as to the merits, several of Petitioners' newfound claim construction positions in the district court contradict Petitioners' prior arguments about the scope of the disclosure of their asserted references and how a POSITA would view them—and demonstrate that the prior art does not cover the claims of the '198 patent. *See* Section VI. For example, Petitioners' construction for “virtual MAC interface,” an agreed construction that the district court is almost certain to enter, is consistent with the arguments Patent Owner made in its POPR and shows that Chincholi—the only reference the Petition asserts contains a virtual MAC interface—does not in fact disclose one. *See* Section VI.A.1. The same is true for agreed constructions for “in a manner transparent...” and “information regarding bandwidth availabilities...” *See* Sections VI.A.2 & 3. For these reasons, the Petition should be denied on the merits.

Additionally, the parties' agreed district court constructions demonstrate Petitioners' acknowledgment that a POSITA in possession of the '198 patent would understand it in the context of a network protocol stack containing layers with

specific functions and rules for how layers may communicate with each other. This Patent Owner Response addresses how a POSITA would understand the claims of the '198 patent in that context, including why a POSITA would understand claim terms including “virtual MAC interface,” “in a manner transparent to...” and “information regarding bandwidth availabilities”¹ in a way that would preclude viewing Chincholi as disclosing those claim limitations. *See* Sections VI.A.1.c; VI.A.2.b; VI.A.3.

For the same reasons, the Petition’s proposed combination of Chincholi with Clegg fails to account for the impact of accepted notions of a protocol stack on the motivation to combine. In looking for elements missing from Chincholi, Petitioners and their expert, Kevin Almeroth Ph.D., fail to address why a POSITA would look to Clegg, and demonstrates improper hindsight bias. Ultimately, as discussed below and confirmed in the Declaration of Robert Akl, D.Sc.—who worked as a POSITA in the field at the time of the inventions—the combination asserted in the Petition does not disclose all of the limitations of the challenged claims, nor does the Petition

¹ This POR addresses the “bandwidth availabilities” term for the first time, including through offering a construction that explains why the prosecution history demands an understanding of the term that distinguishes it from Chincholi. *See* Sections III.3, VI.A.2.

account for technical details of the secondary references that make combination impractical without extensive modification. Accordingly, Patent Owner requests that the Board confirm the patentability of the challenged claims.

II. THE '198 PATENT FOCUSES UPON THE LOWER LAYERS OF A NETWORK PROTOCOL STACK

The '198 patent was filed as U.S. Pat. App. No. 18/819,635 on August 29, 2024 claims priority to provisional applications nos. 61/897,216 and 61/897,219, both filed on October 30, 2013.

At the time of the inventions of the '198 patent, a POSITA would have understood wireless networking devices in terms of a “protocol stack” or “layer stack,” such as the Open Systems Interconnection (“OSI”) model. *See* EX2020 at 2 (including agreed constructions for “virtual MAC interface” including “higher protocol stack layers” and “in a manner transparent...” including “any protocol stack layer of the wireless networking device”); *see also* EX2017 (Akl), ¶46 (“[A]t the time of its priority date, a POSITA would understand that wireless networking devices were conceptualized as a layer stack”).

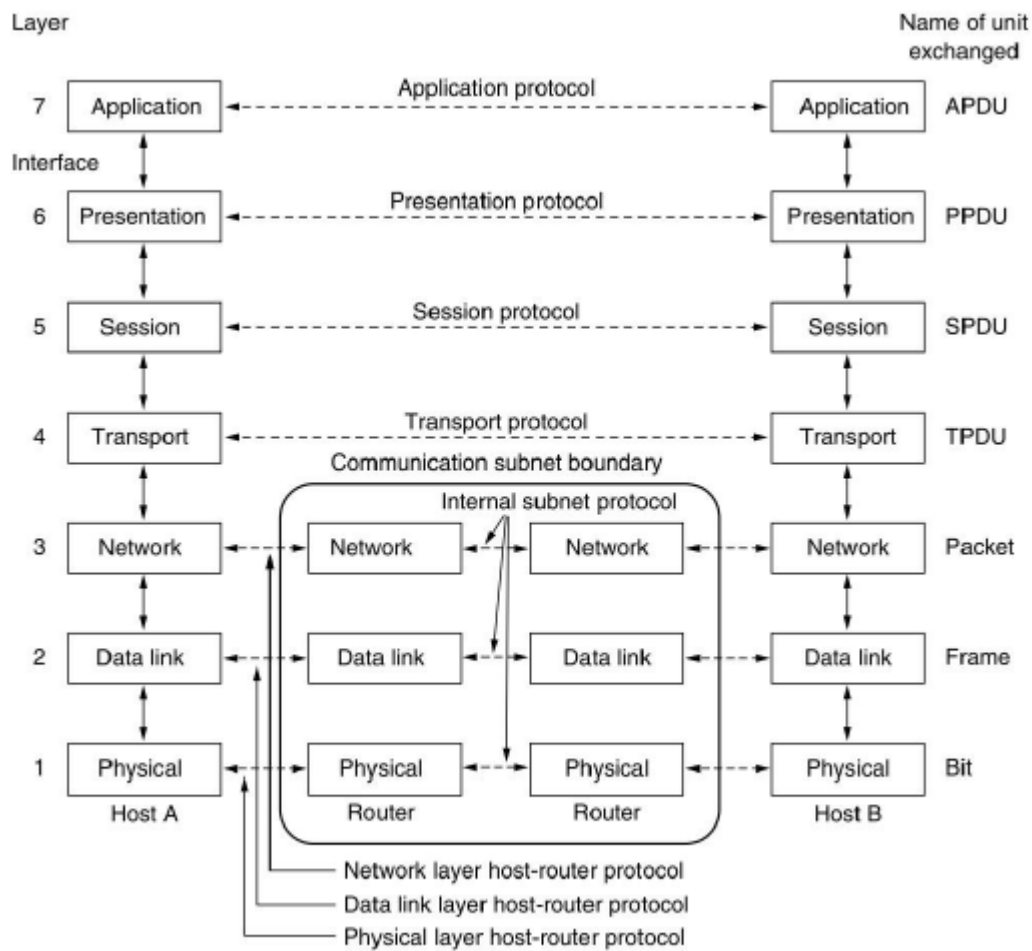


Figure 1-20. The OSI reference model.

EX2018 (Tanenbaum) at 42.

In such layer models, each layer serves a purpose. The first, or bottommost, layer is the physical layer, whose function is to govern the transmission of raw bits of data over a communication channel. *See* EX2018 (Tanenbaum) at 43; EX2017 (Akl), ¶48. Immediately above the physical layer is the data link layer, whose function is to transform the raw data as transmitted by the physical layer into data frames that appear to the next higher layer (the network layer) as error-free. *Id.* A

POSITA would understand the network layer is responsible for routing decisions across the network, and works to avoid bottlenecks and congestion. *See* EX2018 (Tanenbaum) at 43-44; EX2017 (Akl), ¶48.

A POSITA would understand that the data link layer conventionally includes two distinct sublayers. The upper sublayer, closest to the network layer, is typically referred to as the Logic Link Control (“LLC”) sublayer. The lower sublayer, closest to the physical layer, is known as the medium access control (“MAC”) sublayer. *See* EX2010 (Tanenbaum) at 300; EX2017 (Akl), ¶49. The physical layer, as well as the data link layer and its two conventional sublayers, is depicted below:

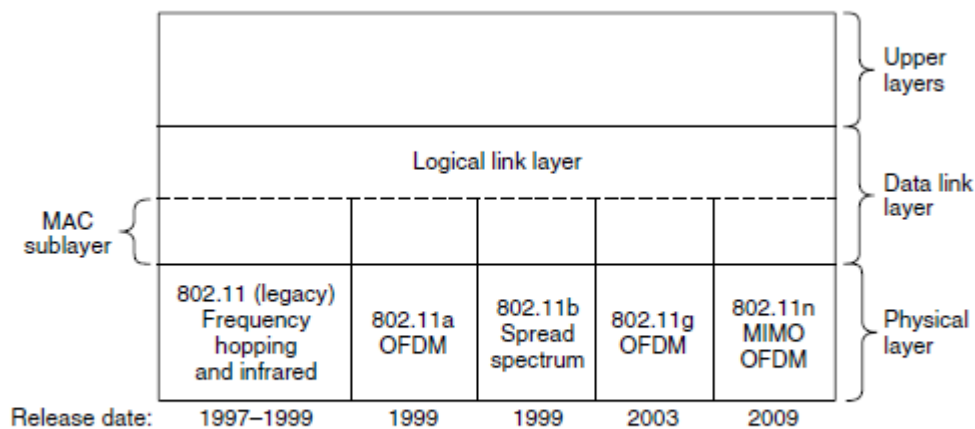


Figure 4-24. Part of the 802.11 protocol stack.

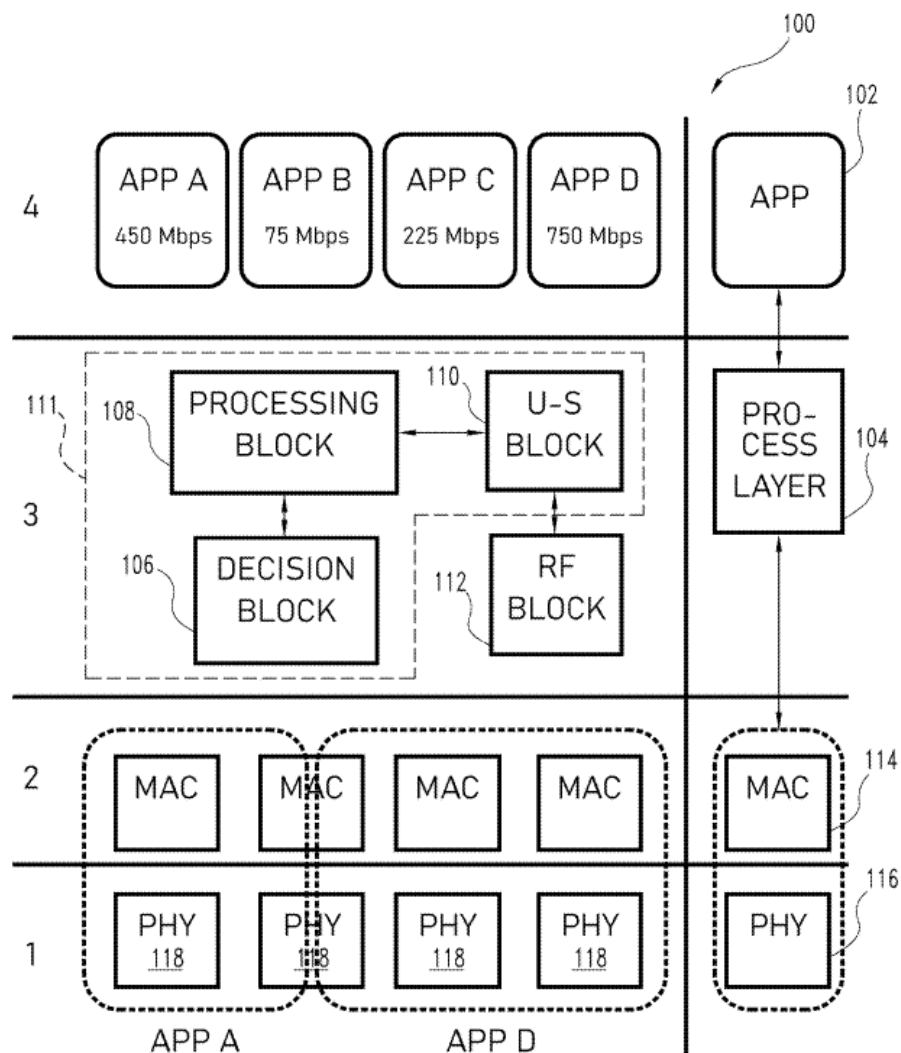
EX2010 (Tanenbaum) at 300.

These layer models “*permit[] direct interaction only between adjacent layers.*” EX2019 (Basic Reference Model), § 7.5.4.2.2; EX2017 (Akl), ¶50. Because of this rule, “the network-entity cannot interact directly with the physical-entity,”

and “interaction is thus described through the Data Link Layer which intervenes transparently to convey the interaction between the Network Layer and the Physical Layer.” *Id.* The MAC sublayer, likewise, would communicate with the Network Layer, via the logical link sublayer. EX2017 (Akl), ¶50 (citing EX2018 (Tanenbaum) at 41-45).

The title of the '198 patent is “Method and Apparatus for Processing Bandwidth Intensive Data Streams Using Virtual Media Access Control and Physical Layers.” Consistent with that title, the inventions claimed in the '198 patent provide improved intelligent resource allocation and bandwidth utilization within wireless network systems by using a virtual MAC interface and a resource monitoring interface. EX1001, Abstract, 2:48-55, 3:2-3:13, 4:40-5:40, 12:34-41, Figs. 1-3. Key aspects of the invention of the '198 patent include the use of virtual MAC interface and resource monitoring interface to facilitate transparent bandwidth decision making, obscuring the addresses and operation of the actual MAC and PHY layers to the upper layers, as well as allowing a single transceiver's bandwidth to be shared among two separate users simultaneously. EX1001, Abstract, Fig. 1.

An illustrative embodiment of the architecture claimed in the '198 patent is depicted in Figure 1, which shows a wireless networking system 100:



EX1001, Fig. 1.

An exemplary virtual MAC layer, as referenced in the title, is depicted as element 111. *Id.* at 3:59-60. An exemplary component of the resource monitoring interface, the RF Block, is depicted as element 112. *Id.* at 3:61. Figure 1 also shows that the system includes various applications (102) with respective data needs. *Id.* at 3:29-31. It also includes a plurality of wireless transceivers which have associated pairs of actual MAC and actual PHY components (118). *Id.* at 4:4-10. The actual

MAC/PHY pairs recited by the claims send feedback information to the resource monitoring interface. *Id.* at 12:34-41.

The actual PHY interfaces are located in the physical layer; the actual MAC interfaces are located in the MAC sublayer of the data link layer, and the processing interface and its components are also located in the MAC sublayer. EX1001, 3:1-10 (“A virtual MAC layer and a virtual PHY layer are defined between the processing layer and the actual MAC and PHY layers.”); 6:14-18 (“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...”); 4:1-10 (“one or more transceiver resources” are located in the “actual physical (PHY) layer.”). Figure 1, depicted above, shows this layered relationship, where the transceiver resources 118 are shown within the actual PHY interfaces 116 on the lowest (physical) layer, with the actual MAC interfaces 114 above, and the process layer 104 containing the virtual MAC layer 111 and the virtual PHY layer 112 above that. *Id.*, Fig. 1 & 3:59-4:10.

The virtual MAC layer is also known as an interface. The virtual MAC interface, with bandwidth availability feedback from the resource monitoring interface, manages signals from the applications regarding sending or receiving data, and determines which resources in the wireless transceiver(s) will be used to respond to the applications. *Id.* at 4:48-5:3. The virtual MAC interface, with feedback from

the resource monitoring interface, provides the point of contact in these communications between the applications and the transceiver(s). *Id.*; *see also id.* at 12:24-31.

The Petition challenges all 30 claims of the '198 patent: 1 independent claim (claim 1) and 29 dependent claims (claims 2-30).

III. THE BOARD SHOULD CONSTRUE THE CLAIMS CONSISTENT WITH THE PARTIES' DISPOSITIVE DISTRICT COURT CLAIM CONSTRUCTION POSITIONS AND THE INTRINSIC RECORD

Petitioners do not request construction of any claim terms from the '198 patent. Pet. at 10. In the co-pending district court proceedings, however, Petitioners and Patent Owner have both taken positions regarding claim construction, including reaching agreement regarding several terms that impact this Petition. *See* EX2020.² Consistent with its positions in the district court, Patent Owner offers the following proposed constructions that will impact the disposition of this matter:

² The parties agreed to plain and ordinary meaning for the terms “do[es] not prevent [other] / [any] wireless networking device[s] [devices] from utilizing a range of frequencies corresponding to the remaining portion of the bandwidth availabilit[y]/[ies],” and “without requiring [the] disassociation of the recipient.” EX2020 at 2, 4. Because these agreed constructions do not impact Patent Owner’s arguments here, Patent Owner does not request any constructions of those terms.

1. “virtual MAC interface”

In the district court, the parties agreed to construe “virtual MAC interface” as: “a software- or logical-based interface that is separately addressable from the recited actual MAC interfaces and that obscures the recited actual MAC interfaces from higher protocol stack layers.” EX2020 at 2.

Several aspects of the parties’ agreed district court construction are pertinent here. First, a “virtual MAC interface” must be “virtual,” or “software- or logical-based.” This is consistent with dictionary definitions from the time of the invention of the ’198 patent. *See* EX2009 (2012 American Heritage Dictionary) at 906 (“virtual” means “[c]reated, simulated, or carried on by means of a computer or computer network” and “[e]xisting ... not in actual fact or form”); *see also* EX2017 (Akl), ¶¶52, 55.

Second, a “virtual MAC interface” uses an address separate from the actual MAC interfaces. An “actual” MAC address is permanent and installed by the manufacturer, i.e., physical. *See* EX2017 (Akl), ¶53 (quoting EX2010 (Tanenbaum) at 339 (“MAC addresses are installed by the manufacturer and guaranteed to be unique worldwide...”). In contrast, a “virtual” MAC address is software- or logical-based. EX2017 (Akl), ¶55. Thus, a “virtual MAC interface” is “separately addressable from the recited actual MAC interfaces.” *Id.*

Third, the parties agree that the virtual MAC interface “obscures the recited actual MAC interfaces from higher protocol stack layers.” EX2020 at 2; *see also* EX2017 (Akl), ¶55 (by using a virtual MAC address, the virtual MAC interface “obscures the recited actual MAC interfaces from higher protocol stack layers”); EX2011 (U.S. Patent No. 8,078,208) at 6:39-40 (“A single virtual MAC address 311 hides the MAC addresses of the several NICs ...”); *id.* at Abstract (invention contains a “virtual layer that hides the multiple physical network interfaces from higher layers of a node’s network protocol stack”). Higher layers are aware only of the virtual MAC address because packets are passed up the protocol stack from the virtual MAC interface with the virtual MAC address in the payload. EX2017 (Akl), ¶¶54-55. This is also consistent with applicant’s statements during a related prosecution locating the virtual MAC interface, as a component of the processing interface, in the MAC sublayer of the data link layer. EX2023 (’105 Patent FH) at 21, 1/11/2024 Second Preliminary Amendment and Applicant Remarks (applicant remarks distinguishing prior art because bandwidth decisions were made “at a layer above the MAC/PHY layers” and that the patent required “all bandwidth allocation decisions be made in a manner transparent to the layers above the MAC/PHY interfaces”); EX2017 (Akl), ¶56; *see also* Section III.3 (explaining why processing interface is located in the MAC sublayer of the data link layer including with reference to bandwidth allocation decisions taking place “lower than the logical link

layer”). Importantly, the fact that the actual MAC addresses are obscured to higher layers means that the Petition fails, since Chincholi’s OMMA does not obscure actual MAC addresses. *See infra*, Section VI.A.1.a.

2. “in a manner transparent to any layer of the wireless networking device above the processing interface”

In the district court, the parties agreed to a construction for “in a manner transparent to any layer of the wireless networking device above the processing interface” of “in a manner where any protocol stack layer of the wireless networking device above the processing interface is unaware of the operation of the processing interface.” EX2020 at 2.

This agreed construction provides a useful framework for understanding the required relationship between the claimed layers in the protocol stack. First, it emphasizes that a POSITA would view the claimed wireless networking device in the context of a layer stack. This is consistent with statements applicant made during prosecution that claimed functions were “transparent to the layers of the wireless networking device above its MAC/PHY interfaces.” EX2023 (’105 Patent FH) at 34, 2/5/2024 Third Preliminary Amendment and Applicant Remarks; EX2017 (Akl), ¶59; *see also* Section III.3 (explaining why processing interface is located in the MAC sublayer of the data link layer including with reference to functions about the MAC/PHY layers being transparent). Second, it affirms that a POSITA would

understand the term “transparent” to indicate that layers above a particular place in the layer stack (here, the processing interface) are unaware of the functions below. *See* EX1001, Abstract; EX2017 (Akl), ¶58.

3. “information regarding the first and second bandwidth availabilities”

In the district court, the parties put forward separate proposals for the construction of “information regarding the bandwidth availabilities of the first and second wireless transceivers.” EX2020 at 5:

Patent Owner Proposed Construction	Petitioners Proposed Construction
“information regarding current bandwidth availabilities of the recited wireless transceivers, that can be obtained directly from at least the recited actual PHY interface(s) and the recited actual MAC interface(s)”	“information regarding current bandwidth availabilities of each of the wireless transceivers”

Thus, the parties agree that the “information” relates to “current” bandwidth availability. *See* EX2021 (Mahon Decl.), ¶73 (Petitioners’ expert in the district court noting agreement between the parties as to “current” bandwidth availabilities); EX2017 (Akl), ¶61. This is consistent with the teachings of the specification. *See, e.g.,* EX1001, 5:11-18 (“determin[ing] device availability” “involves a determination at the PHY layer as to the **actual availability** of the initially assigned transceiver resources”); *see also id.*, 3:50-58; 4:36-39; 5:64-5:3; 8:37-45; EX2017

(Akl), ¶61.³ Applying this agreed portion of the construction, the Petition fails to demonstrate that Chincholi discloses feeding back bandwidth availabilities, since it discloses instead historical statistics. *See infra*, Section VI.A.2.a.

Patent Owner also proposes, both here and in the district court, that the information regarding bandwidth availabilities, in addition to being “current,” must have the capacity to be “obtained directly from at least the recited actual PHY interface(s) and the recited actual MAC interface(s).” EX2020 at 5. This construction is consistent with the intrinsic record and, when applied, provides further reasons why the Petition fails. *See infra*, Section VI.A.2.b.

The specification demonstrates direct communication between the actual PHY interfaces and actual MAC interfaces with the resource monitoring interface of the processing interface. Before arriving at the resource monitoring interface,

³ This is further consistent with the way Applicant presented claims of related patents during prosecution, highlighting that availabilities were evaluated on a per-transmission-opportunity basis. *See, e.g.*, EX2024 (’337 Patent FH) at 12, 9/18/2023 amendment (bandwidth availability of each transceiver evaluated for each transmission opportunity); EX2025 (’414 patent FH) at 11, 9/18/2023 amendment (feedback provided as of each transmission opportunity); EX2017 (Akl), ¶61.

“information regarding the bandwidth availabilities” is collected in the actual PHY interfaces. *See* EX1001, 4:1-10 (“one or more transceiver resources” are located in the “actual physical (PHY) layer”); 12:26-34 (wireless transceivers associated with the actual PHY interfaces). The information is then communicated to the processing interface, via the resource monitoring interface and then to the virtual MAC interface. *See id.* 5:11-15 (“The virtual MAC **302** interfaces with the virtual PHY **304** to determine device availability. This further involves a determination at the PHY layer as to the actual availability of the initially assigned transceiver resources.”); 12:34-41 (“wherein the processing interface comprises, at least one virtual MAC interface, at least one resource monitoring interface that, after the circuitry has been connected to the wireless networking device and during operation of the wireless networking device, provides information regarding the first and second bandwidth availabilities to the virtual MAC interface”); *see also* EX1017 (Akl), ¶61. A POSITA would understand the wireless transceivers to be associated with the actual PHY interfaces in the PHY layer, and the actual MAC interfaces to be in the MAC sublayer of the data link layer. *See supra*, Part II; EX1001, 3:59-4:10; EX2017 (Akl), ¶64.

These steps are exemplified by Figure 4 of the common specification, which shows a direct communication from the actual PHY interfaces (shown as Devices 1 and 2) to the virtual PHY interface:

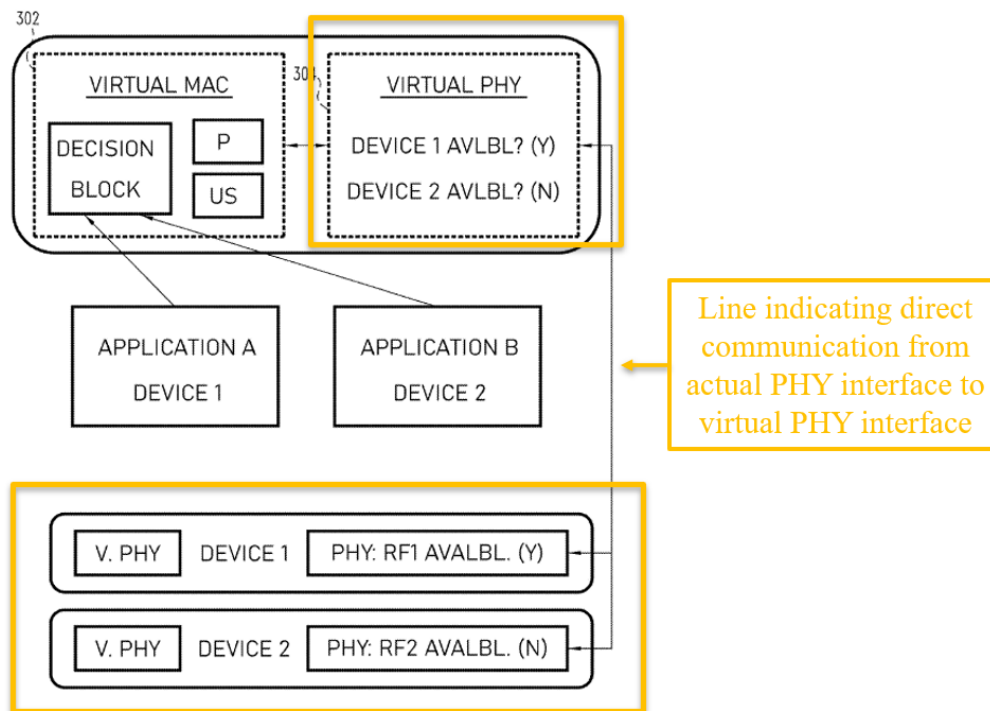


Fig. 4

Id., Fig. 4 (annotations added); *see also id.* at 5:4-24; EX2017 (Akl), ¶65. Because the specification is clear that the source of the information about the bandwidth availabilities is the physical layer, a POSITA would understand that the virtual PHY interface could be no higher in the layer stack than the adjacent data link layer. *See* EX1001, 5:14-16 (“This further involves a determination [of device availability] at the PHY layer as to the actual availability of the initially assigned transceiver resources.”); EX2019 (Basic Reference Model), § 7.5.4.2.2; EX2017 (Akl), ¶65. Further, because a resource monitoring interface performs the same function of feeding back bandwidth availability as the virtual PHY interface, a POSITA would

understand it to be located at the same layer. *See* EX1001, 12:25-30; EX2017 (Akl), ¶65.

The file histories of the related patents repeatedly explain that the processing layer is adjacent to the actual physical layer, and that it is lower than the logical link layer—therefore in the MAC layer of the data link layer—enabling the ability for the bandwidth availability information to be directly communicated from either or both the actual PHY interfaces and actual MAC interfaces to the processing layer. These file history statements are important to demonstrating the scope of the claims and the way in which a POSITA would understand them. *See, e.g., Fenner Invs., Ltd. v. Cellco P’ship*, 778 F.3d 1320, 1323 (Fed. Cir. 2015) (“Any explanation, elaboration, or qualification presented by the inventor during patent examination is relevant, for the role of claim construction is to ‘capture the scope of the actual invention’ that is disclosed, described, and patented.” (quoting *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1305 (Fed. Cir. 2011))); *Microsoft Corp. v. Multi-Tech. Sys., Inc.*, 357 F.3d 1340, 1350 (Fed. Cir. 2004) (holding statements made during prosecution relevant to all related patents). Indeed, “[P]rosecution history is strong evidence of what a skilled artisan ‘would have understood disputed claim language to mean.’” *Kaken Pharm. Co. v. Iancu*, 952 F.3d 1346, 1353 (Fed. Cir. 2020).

“Particularly useful are ‘express representations made by or on behalf of the applicant to the examiner to induce a patent grant,’ which include ‘arguments made to convince the examiner that the claimed invention meets the statutory requirements of novelty, utility, and nonobviousness.’” *Kaken*, 952 F.3d at 1353 (quoting *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985)). Exactly this happened during the prosecution of the ’591 patent, which is the eldest asserted patent and an ancestor to the ’198 patent. There, the claims issued after the examiner’s acknowledgement that communication of bandwidth availabilities from the wireless transceiver circuitry (physical layer) to the distributed processing logic (data link layer) was not disclosed in the prior art. In the February 8, 2023 Office Action, the examiner noted the prior art did “not disclose ‘the indicator of wireless transceiver availability is fed back from the wireless transceiver circuitry to the distributed processing logic.’” EX2022 (’591 Patent File History) at 20, 2/8/2023 Office Action. A POSITA would understand that this language references a communication from layer 1 (the Physical Layer) to layer 2 (the Data Link Layer). EX2017 (Akl), ¶66.

In response, applicant noted that this non-disclosed element was present in the claim term “wherein ... during operation of the wireless networking device, feed information regarding the bandwidth availabilities of the first, second, and third wireless transceivers back to the at least one virtual MAC interface.” EX2022 (’591

Patent FH) at 30, 8/8/2023 Amendments and Response to Office Action; *see also id.* at 22-23 (language of referenced claim 22). The patent was then allowed, and the claims issued. *Id.* at 41-43, 9/9/2023 Notice of Allowability (statement of reasons for allowance of claim 22). Confirming the importance of this exchange to the allowance of the claims and to the meaning of the claim term, applicant also referenced this reason for allowance in several related file histories, after which the patents eventually issued with the “bandwidth availabilities” claim term. *See, e.g.*, EX2023 (’105 Patent FH) at 9-10, 12/8/2023 Preliminary Amendment and Applicant Remarks; EX2017 (Akl), ¶67.

Given these statements in the ’591 Patent file history (and where applicant incorporated these statements in the several related patents’ prosecutions), a POSITA would understand that the wireless transceiver bandwidth availability information must be able to be directly communicated to the processing interface, which must be in the same layer or an adjacent layer as the wireless transceivers. EX2017 (Akl), ¶¶66-67; *Kaken*, 952 F.3d at 1353; *Fenner*, 778 F.3d at 1323.

Further applicant statements in the ’756 patent’s file history make even clearer that a POSITA would understand that the bandwidth availabilities information must have the capacity to be provided directly by both the actual MAC interfaces and the actual PHY interfaces:

The dashed line box surrounding two boxes labelled “MAC” 114 and “PHY” 116 in Figure 1 are schematic representations of the actual MAC and PHY layers of a wireless networking device that includes at least two wireless transceivers. A two-way arrow connects the dashed box with a “process layer” 104. This discloses that *each actual MAC and each actual PHY in a particular wireless networking device communicates directly with the processing layer to allow it to receive information regarding bandwidth availabilities from the wireless transceiver* associated with each MAC/PHY pair.

EX2026 (’756 Patent FH) at 8, 8/15/2024 Preliminary Amendment and Applicant Remarks; EX2017 (Akl), ¶68.

This statement by applicant demonstrates that each actual PHY interface and each actual MAC interface has the ability to communicate bandwidth availabilities directly to the processing interface. EX2017 (Akl), ¶68. Because the actual PHY interface can communicate directly with the processing interface, they must be in the same layer or in adjacent layers. *Id.* (citing EX2019 (Basic Reference Model), § 7.5.4.2.2). This is also consistent with direct communication from the actual MAC interface to the processing interface, because both are in the same layer. *Id.*

Moreover, additional statements by applicant across the file histories of related patents locate the processing interface in a layer adjacent to the physical layer—i.e., in the in the MAC sublayer of the data link layer—therefore enabling direct communication of bandwidth availabilities from the actual PHY interfaces and actual MAC interfaces to the processing interface, including when discussing the provision of information regarding bandwidth availabilities. *See* EX2028 (’564

Patent File History) at 24-25, 6/18/2024 Amendments After Allowance (applicant remarks noting the claims recite a “*resource monitoring interface’ [that] operates in a processing layer below the logical link layer and provides information about the bandwidth availability of the transceivers associated with the actual PHY interfaces*” to the virtual MAC interface); *id.* at 370, 6/19/2024 Amendments After Allowance (same); EX2027 (’177 Patent FH) at 10, 6/18/2024 Preliminary Amendment and Applicant Remarks (applicant remarks noting that claimed “*processing layer [operates] below the logical link layer [i.e., in the MAC sublayer of the Data Link layer] and provides information about the bandwidth availability of the transceivers associated with the actual PHY interfaces*”); *see also* EX2017 (Akl), ¶69.

The related file histories include consistent statements distinguishing the location of the processing interface from the prior art because, previously, functions of the processing interface were performed “at a layer above the MAC/PHY layer”—indicating that the processing interface is at the MAC layer or lower. *See* EX2023 (’105 Patent FH) at 21, 1/11/2024 Second Preliminary Amendment and Applicant Remarks (applicant remarks distinguishing prior art because bandwidth decisions were made “at a layer above the MAC/PHY layers”); *id.* at 34, 2/5/2024 Third Preliminary Amendment and Applicant Remarks (applicant remarks regarding functions “transparent to the layers of the wireless networking device above its

MAC/PHY interfaces”); EX2026 (’756 Patent FH) at 18, 10/11/2024 Amendment and Response to Non-Final Office Action (applicant remarks distinguishing prior art because routing decisions in the prior art were made above processing layer, i.e., at a layer “above the data link layer”); EX2029 (’143 Patent FH) at 13, 1/9/2024 Third Preliminary Amendment and Applicant Remarks (applicant remarks distinguishing prior art because routing decisions in the prior art were made above processing layer, or “at a layer above the MAC/PHY layers”); *id.* at 24, 2/5/2024 Fourth Preliminary Amendment and Applicant Remarks (applicant remarks regarding functions “transparent to the layers of the wireless networking device above its MAC/PHY interfaces”); *see also* EX2017 (Akl), ¶¶69-70.

Altogether, the specification and related patent file histories tell a consistent story: an important inventive aspect of the XiFi inventions is that the bandwidth availability information of the recited transceivers is collected in the actual PHY interfaces, where it can then be directly communicated to the processing interface components including the virtual PHY interface and virtual MAC interface because they are located in a layer adjacent to the actual PHY interfaces.

IV. LEVEL OF ORDINARY SKILL IN THE ART

For the purposes of these proceedings, Patent Owner does not dispute Petitioners’ recitation of the *level* of skill for a person of ordinary skill in the art (“POSITA”). Patent Owner does not necessarily agree, however, with the

statements made in the Petition and the accompanying declaration of Dr. Almeroth as to what a POSITA would have known and/or found “straightforward.”

V. THE PETITION SHOULD BE TERMINATED FOR FAILURE TO COMPLY WITH 37 C.F.R. § 42.204(b)(3)

In the Petition, Petitioners argued that “[n]o express constructions are required to find the ’198 patent claims invalid” and its expert applied the “plain and ordinary meaning of all claim terms as understood by a POSITA.” Pet. at 10; EX1002, ¶64. However, since the Petition was filed, Petitioners have propounded narrower constructions in the co-pending district court action—constructions that are directly contrary to the positions taken in the Petition and which merit terminating the Petition. EX2020.

“It is axiomatic that claims are construed the same way for both invalidity and infringement.” *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003). Indeed, the PTAB’s “rules discourage petitioners from seeking broader constructions at the Board to support a patentability challenge while seeking narrower constructions in litigation to avoid infringement liability.” *Revvo Techs., Inc. v. Cerebrum Sensor Techs, Inc.*, IPR2025-00632, Paper 20 at 4 (November 3, 2025) (precedential) (citing *Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51,340 51,349-50 (Oct. 11, 2018)).

While a petitioner may be excused from offering inconsistent positions based on sufficient explanation as to “why the different positions are warranted” (*id.* at 5), there can be no sufficient explanation here, where Petitioners maintain narrower positions with regard to at least three claim construction terms in the district court that directly contradict their positions taken here. *See Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 36 at 4 (Jan. 26, 2026) (Director Squires explaining that “in the generally rare instances where diverging constructions are advanced before two different tribunals, a party may proffer a different, broader construction before the Board when the district court *already has rejected* petitioner’s narrower construction.” (emphasis in original)).

For example, Petitioners here offer plain and ordinary meaning for the claim term “virtual MAC interface.” Pet. at 10; EX1002, ¶64. But in the district court, they agreed to an explicit construction that mandates that the virtual MAC interface “obscures the recited actual MAC interfaces from higher protocol stack layers.” EX2020 at 2. Here, however, Petitioners argued that Chincholi’s OMMA contains structures comprising a virtual MAC interface, when in fact those structures pass along actual MAC addresses without obscuring them. *See* Pet. at 23; EX1002, ¶98 (identifying OMMA as “acting as a ‘virtual MAC interface’”). But a POSITA would recognize that the OMMA merely aggregates packets and passes them along, using a “device address,” thereby exposing the actual MAC addresses of Chincholi’s radio

access technology interfaces—the opposite of obscuring them. EX1005, [0120], [0137]-[0143], [0192], [0205], [0383]; EX2017 (Akl), ¶¶78-80; *see also* Section VI.A.1.a. Therefore, under the construction agreed to by the Petitioners in the district court, the asserted prior art does not disclose a virtual MAC interface. *See* Section VI.A.1.a.⁴

Similarly, Petitioners here advocate for the plain and ordinary meaning of the claim term “information regarding the bandwidth availabilities...” Pet. at 10; EX1002, ¶64. As explained above, Patent Owner here argues that that term should be interpreted as relating to “current bandwidth availabilities.” *See supra*, Section III.3. This is consistent with Patent Owner’s position in the district court—and with Petitioners’, who joined Patent Owner in supplying a claim construction position for that term that included “current bandwidth availabilities.” EX2020 at 5; *see also*

⁴ Petitioners also agreed to a narrowing construction for “in a manner transparent to any layer of the wireless networking device above the processing interface” as “in a manner where any protocol stack layer of the wireless networking device above the processing interface is unaware of the operation of the processing interface.” This narrowing construction is not only inconsistent with the plain and ordinary meaning analysis supplied in the Petition, it also weighs in favor of Patent Owner’s arguments on the merits. *See infra*, Section VI.A.3.

EX2021 (Mahon Decl.), ¶73 (“The parties appear to agree that this term requires that the information fed back or provided is information regarding the ‘current’ bandwidth availabilities of the wireless transceivers.”). But as explained below, Chincholi only discloses the ability to feed back historical statistics and metrics, rather than the “current” bandwidth availabilities that the challenged claims here require. *See infra*, Section VI.A.2.a. Again, Petitioners take a narrow position in the district court to avoid infringement, while taking a broad position before this Board to capture the disclosure of their asserted references.

Likewise, in the district court, Petitioners declined to agree with Patent Owner’s position that “wireless networking device” required no construction and could be given its plain and ordinary meaning, and instead took the position that “wireless networking device” was “a device that relays or provides network access to another device.” EX2020 at 4. To support that position, Petitioners’ expert opined that “‘client’ devices in the infrastructure mode ... would not qualify as a ‘wireless networking device’ as they are merely end-users and do not relay or provide network access to another device.” EX2021 (Mahon Decl.), ¶68; *see also id.* ¶66 (“infrastructure mode involv[es] clients communicating with the network through one or more wireless access points”).

However, in proceedings before the Board regarding a related patent also claiming a “wireless networking device,” Petitioners’ expert (applying plain and

ordinary meaning) opined that primary reference Chincholi disclosed a “wireless networking device” via a client device operating in infrastructure mode—exactly the opposite of what Petitioners argue in the district court. *See, e.g., Samsung Elecs., Co. v. XiFi Networks R&D, Inc.*, IPR2025-01209, EX1002, ¶143 (“Chincholi discloses that the WTRUs of its wireless communication networks may comprise any one of a ‘user equipment (UE), a mobile station, a fixed or mobile subscriber unit, a *pager*, a *cellular telephone*, a *personal digital assistant (PDA)*, a *smartphone*, a laptop, a netbook, a personal computer, a wireless sensor, consumer electronics, and the like.’ Thus, a POSITA would have recognized that Chincholi discloses that the wireless networking device of claim 1 comprises a handheld computing device.” (quoting EX1005 (Chincholi), [0074])); EX2030 (Mahon. Dep.) at 108:2-114:19 (agreeing that Chincholi’s Fig. 1A as described in EX1005 at [0074]-[0075] describes “transmission going between the devices” that include on the one hand access points and on the other hand devices such as smartphones or laptops); EX2017 (Akl), ¶51 (opining that Fig. 1A discloses communication in infrastructure mode).

In short, Petitioners are presently advancing a narrow claim construction in the district court, seeking to avoid broad application of Patent Owner’s claims to their products (e.g., smartphones and tablets) while advancing a broad construction here in order to read their primary prior art reference on the claims. Were

Petitioners' district court constructions applied (as they should be), the Petition fails to show the asserted references cover the challenged claims.

Because the Petitioners take inconsistent claim construction positions in the district court proceedings and in the Petition here, without sufficient explanation, Patent Owner requests that institution be vacated and terminated, and that the Petition be denied. *See, e.g., Infineon Techs. Am. Corp. v. MOSAID Techs., Inc.*, IPR2025-01171, Paper 27 at 3-4 (Feb. 19, 2026) (director review order vacating and terminating institution where petitioner took inconsistent claim construction positions in the district court and before the Board); *Carbyne, Inc. v. Tritech Software Sys.*, IPR2025-00959, Paper 20 at 3-4 (Feb. 19, 2026) (same); *Revvo Techs., Inc. v. Cerebrum Sensor Techs, Inc.*, IPR2025-00632, Paper 36 at 4 (Jan. 26, 2026) (same). For further discussion, *see* Patent Owner's Request for Director Review (Paper 17).

VI. THE PETITION DOES NOT ESTABLISH THAT THE APPLIED REFERENCES RENDER THE CHALLENGED CLAIMS UNPATENTABLE

The Petition does not establish that Chincholi in combination with Clegg (Ground 1) discloses all of the limitations of any '198 patent claim, or that a POSITA would be motivated to combine the references. Indeed, applying the claim construction positions that Petitioners have taken in the district court, its cited references do not disclose at least the claimed "virtual MAC interface" (Section

VI.A.1); the claimed “information regarding the bandwidth availabilities ...” (Section VI.A.2); or the claimed “processing interface” acting “in a manner transparent to any layer of the wireless networking device above the processing interface” (Section VI.A.3). Nor do Petitioners establish that a POSITA would have modified primary reference Chincholi with secondary reference Clegg (Section VI.B). The Board should deny the Petition for at least those reasons.

A. The Petition Does Not Establish that Chincholi Discloses Limitations Common to All Challenged Claims

Based on the evidence put forward in the Petition and especially in light of Petitioners’ claim construction positions in the district court, it is clear that Petitioners’ primary reference, Chincholi (EX1005), lacks a number of independent claim 1’s limitations and the Petition makes no attempt to argue any other reference discloses these limitations.

1. Chincholi does not disclose a “virtual MAC interface”

The Petition has not established that Chincholi discloses “a virtual MAC interface.” *See* Pet. at 22-25. Independent claim 1 (from which all other challenged claims depend) recites that the processing interface includes at least one virtual MAC interface. EX1001, 12:34-35. In the district court, the Petitioners take the position that a “virtual MAC interface” is “a software- or logical-based interface that is

separately addressable from the recited actual MAC interfaces and that obscures the recited actual MAC interfaces from higher protocol stack layers.” EX2020 at 2.

The Petition asserts that Chincholi’s OMMA layer “includes the claimed ‘virtual MAC interface,’” merely because it “aggregates multiple MAC interfaces,” and “because it transparently ‘distributes and/or combines’ packets between the IP layer and the RATs.” Pet. at 23. The Petition’s arguments, however, fail to demonstrate why Chincholi’s OMMA is “virtual,” especially under the definition that Petitioners now advocate in the district court; this is particularly so because the OMMA layer does not obscure actual MAC addresses. Moreover, the Petition’s functional comparison fails to actually show alike functions. Finally, because the intrinsic record demands that the virtual MAC interface be located in the second layer of a protocol stack, while the identified portions of Chincholi are located at the third layer of a protocol stack.

a. The Petition fails to show that Chincholi discloses a “virtual” MAC interface that obscures actual MAC addresses

Petitioners have failed to meet their burden because the Petition does not address why Chincholi teaches the “virtual” limitation. As explained above (Section III.1, Part V), Petitioners do not advocate for a claim construction of virtual MAC interface in this proceeding, but in the time since the filing of the Petition have agreed to a construction in the district court that conforms to Patent Owner’s

arguments in its preliminary response and here: “a software- or logical-based interface that is separately addressable from the recited actual MAC interfaces and that obscures the recited actual MAC interfaces from higher protocol stack layers.” EX2020 at 2; *see supra*, Section III.1.

Under this agreed construction, the Petition fails. There is no evidence in Chincholi that the actual MAC addresses of the RATs are “obscured”—rather, they are passed along and knowable to upper layers. EX2017 (Akl), ¶¶79-80; EX1005, [0142]. Indeed, Dr. Almeroth, Petitioners’ expert, opines that a POSITA would have recognized that the OMMA “‘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.” Pet. at 23; EX1002, ¶98 (citing EX1005, [0120] [0192]). But this merely means that the information from each RAT—including each RAT’s actual MAC address—is transmitted together. EX2017 (Akl), ¶80. It does not mean that the actual MAC addresses are obscured; rather, they are apparent to the OMMA and to layers above the OMMA. *Id.* In contrast, in the ’198 patent, packets are addressed using the virtual MAC address; upper layers do not see the actual MAC addresses. *See* EX1001, 4:56-59; EX2017 (Akl), ¶81. This enables a number of recited functions and limitations discussed below in Sections VI.A.3-5.

Further, the Petition contains no evidence that Chincholi's OMMA meets the definition of "virtual" or "virtual MAC interface." In fact, the Petition stops one step short of claiming Chincholi's OMMA layer *is* a virtual MAC interface, preferring to argue that it is "***acting as*** a virtual MAC interface." Pet. at 23; EX1002, ¶98 (emphasis added). This is wrong for several reasons—most glaringly, because Chincholi does not disclose a *virtual* MAC interface at all. Indeed, Chincholi does not once contain the word "virtual" in its lengthy disclosure. *See generally* EX1005; *see also* EX2017 (Akl), ¶76. Nor does the Petition or Dr. Almeroth attempt to define "virtual," or explain why aggregation, distribution, or combination of packets between the IP layer and the RATs of Chincholi would meet an accepted definition of "virtual." *See* Pet. at 22-25; EX1002, ¶¶96-100. In fact, none of that is "virtual." Nothing in Chincholi describes or suggests a "virtual" MAC interface, either according to plain and ordinary meaning or according to the explicit claim construction agreed to by the parties. EX2017 (Akl), ¶¶78-81. Indeed, although a virtual MAC interface would have a programmed or non-static address, Chincholi's OMMA is not disclosed as being a separately addressable entity at all; it merely acts as a conduit to pass on packets received from different RATs (each with its own knowable actual MAC address), taking multiple inputs and sending them out as one output. EX1005 at [0137]-[0143], [0383]; EX2017 (Akl), ¶78. In doing so, Chincholi's OMMA sends aggregated packets to the IP layer with the payload of

each packet containing the actual MAC address of the RAT from where it originated. EX2017 (Akl), ¶79; EX1005, [0205] (OMMA layer uses “device address”).

Ultimately, nothing in the four corners of Chincholi purports to characterize the OMMA as “virtual” and nothing in the Petition demonstrates that Chincholi meets the definition of “virtual MAC interface” Petitioners have now agreed to. Consequently, the Petition’s attempt to map Chincholi’s OMMA onto the ’198 patent’s virtual MAC interface fails because it ignores the requirement that the interface be, in fact, “virtual.”

b. The identified elements of Chincholi do not perform the functions of the claimed “virtual MAC interface”

Instead of demonstrating that the OMMA layer fits the definition of a “virtual” MAC interface, the Petition resorts to equivalents-type arguments. First, the Petition asserts that the OMMA layer “includes an interface *acting as* a virtual MAC interface” because the OMMA layer “aggregates multiple MAC interfaces” and “‘distributes and/or combines’ packets between the IP layer and the RATs.” Pet. at 23 (emphasis added); EX1002, ¶98. But “acting as” a virtual MAC interface does not amount to *being* a virtual MAC interface—which would involve the upper layers interacting with an interface with a non-physical address.

The most that the Petition and Dr. Almeroth can do is reduce the term “virtual MAC interface” to some of its illustrative or exemplary functions and components—

namely, modules referred to in the Figure 1 embodiment of the '198 patent as the “decision,” “processing,” and “ultra-streaming” blocks. Pet. at 22; EX1002, ¶96. The Petition and Dr. Almeroth presume that if they can match the functions in the modules of Chincholi with the blocks within the Figure 1 embodiment of the virtual MAC interface, they can show equivalence.

But to the extent functional comparison is appropriate, Chincholi is missing that functionality, and the Petition’s comparison fails. EX2017 (Akl), ¶82. For example, the virtual MAC interface of the '198 patent controls the operation and bandwidth allocation decisions with respect to the actual MAC layers below it. EX1001, 3:7-13, 3:38-60, 10:45-48; EX2017 (Akl), ¶83. In contrast, Chincholi states that the OMMA layer is merely a “mechanism to aggregate two or more RATs *operating independently* on two or more bands to enhance the total IP throughput of the link.” EX1005, [0120] (emphasis added). Clearly, Chincholi’s “two or more RATs”—“operating independently”—*are not* directed by the OMMA layer, while the actual MAC interfaces of the '198 patent *are* directed by the virtual MAC interface. EX2017 (Akl), ¶83.

Further, the Petition asserts that certain modules within Chincholi’s OMMA layer—the traffic shaping module 601, the MAC resource reservation module 602, and the IP QoS Scheduler module 603—include “all of the functionality the '198 patent associates with the ‘virtual MAC interface.’” Pet. at 23 (citing EX1002, ¶99);

EX1005, [0139]). But the Petition points to no module that “obscures the recited actual MAC interfaces from higher protocol stack layers,” as Petitioners agree the virtual MAC interface must. Pet. at 22-25; EX2020 at 2. And the Petition is wrong on the substance of its module-to-block comparisons. For example, the Petition asserts that Chincholi’s IP QoS Scheduler equates to the ’198 patent’s decision block. Pet. at 24-25; EX1002, ¶100; EX1005, [0143]. But the IP QoS Scheduler “may segregate a single IP packet stream comprising multiple IP QoS types into distinct IP QoS streams.” EX1005, [0143]. It does not “determine the size and type of data being received,” nor does it determine the “type of processing necessary to put the stream in a format where it is capable of being transmitted”—the functions of the decision block. EX1001, 3:41-44; EX2017 (Akl), ¶85. The Petition and Dr. Almeroth make no attempt to describe why these functions are equivalent—because they are not equivalent. EX2017 (Akl), ¶85.

Similarly, the MAC resource reservation module “determine[s] an amount of time duration” for packet transmission. EX1005, [0142]. Despite the Petition’s argument (Pet. at 24-25; EX1002, ¶100), this is not the same as the processing block of the ’198 patent, which “processes the data stream as determined by the decision block” in order “to put the stream in a format where it is capable of being transmitted.” EX1001, 3:41-46; EX2017 (Akl), ¶86. Again, the Petition provides no explanation for why these two functions—one dealing with time, and one dealing

with format for transmission—are remotely equivalent. And indeed, a POSITA would not understand them to be the same. EX2017 (Akl), ¶86.

Finally, the Petition attempts to equate the traffic shaping module of Chincholi with the ultra-streaming block of the '198 patent. Pet. at 25; EX1002, ¶100. Chincholi's traffic shaping module "may determine the way a packet is routed using policy based routing or feedback based routing." EX1005, [0139]-[0141]. Meanwhile, the '198 patent's ultra-streaming block "manages the processing of signal streams or sub-streams given the available resources (memory, processing speed, number of available radios, etc.) and packetizes sufficiently processed streams or sub-streams." EX1001, 3:46-58; 4:64-5:3. The Petition does not and cannot explain how the traffic shaping module of Chincholi performs packetizing. EX2017 (Akl), ¶87. In short, even if it were enough to point to similar functionality, none of the modules in Chincholi's OMMA layer that the Petition identifies do the same things as the three blocks of the Figure 1 embodiment of the '198 patent to which the Petition compares them. This is true whether or not the Board considers the parties' agreed construction for "virtual MAC interface."

In all, the OMMA layer of Chincholi is missing both the form and function of the virtual MAC interface of the '198 patent. First, the OMMA layer is not virtual—there is nothing in Chincholi—nor in the Petition or accompanying papers—that describes what about the OMMA layer involves hiding a physical address behind a

virtual interface. Second, the OMMA layer and its modules do not perform the functions that the Figure 1 virtual MAC interface performs. And even if functional equivalence were sufficient, a POSITA would not understand the OMMA layer of Chincholi to disclose the Figure 1 embodiment of virtual MAC interface. EX2017 (Akl), ¶¶82, 84.

c. Chincholi's OMMA sits at layer 3 of a protocol stack and does not disclose a virtual MAC interface at layer 2, as disclosed in the '198 patent

As explained above, the intrinsic record commands that the processing interface of the '198 patent be in a protocol stack layer adjacent to the actual PHY layer—and indeed, that it be “below the logical link layer”—as a manner of distinguishing the inventions of the '198 patent and the patents in its family from the prior art. *See supra*, Section III.3. The processing interface includes the virtual MAC interface, which therefore must be no higher in the protocol stack than layer 2. *See* EX1001, 12:34-35 (“wherein the processing interface comprises, at least one virtual MAC interface”).

Likewise, the functions of the virtual MAC interface are quintessential layer 2 functionalities. For example, the ultra-streaming block, one component of the virtual MAC interface, carries out a monitoring function that a POSITA would understand to be associated with layer 2. *See* EX1001, 3:50-58; EX2017 (Akl), ¶88; *supra*, Section III.3 (summarizing statements in prosecution history locating

processing interface at layer 2). Further, a POSITA would understand that moving these layer 2 functions to layer 3 would break the layered abstraction and cause architectural and operational problems, including related to efficiency, scalability, and operability. EX2017 (Akl), ¶88.

On the contrary, the structures in Chincholi identified by Petitioners as the virtual MAC interface are explicitly associated with layer 3. As explained above, the Petition equates three modules of Chincholi's OMMA layer with the virtual MAC interface.⁵ Dr. Almeroth concedes that the operation of OMMA he identifies as a virtual MAC interface is operating in the IP layer, stating that OMMA “virtualizes’ a MAC interface because the OMMA would effectively appear to the IP layer as a single interface for exchanging packets are ultimately sent or received by the actual MAC-PHY pairs.” EX1002, ¶98; *see also* Pet. at 23 (same).

Moreover, a POSITA would associate each of the traffic shaping module 601, the MAC resource reservation module 602, and the IP QoS Scheduler module 603 with the network layer (layer 3). EX2017 (Akl), ¶88. The traffic shaping module is

⁵ A POSITA would further understand that the OMMA layer generally must be located at layer 3 because it can directly communicate with the transport layer, or layer 4. *See* EX1005, [0171]-[0186]; [0369]-[0370]; EX2017 (Akl), ¶89; EX2019 (Basic Reference Model), § 7.5.4.2.2.

“responsible for determining the way packets are routed” (EX1005, [0139]), which a POSITA would understand to be a network layer function because it refers to “packets,” as well as how those packets are routed. EX2017 (Akl), ¶88; EX2018 (Tanenbaum) at 42 (noting “name of unit exchanged” at network layer is “packet”); *id.* at 43 (noting that a key issue for the network layer is “determining how packets are routed”). Similarly, the MAC resource reservation module determines time and bandwidth resources required “by a packet or set of packets”—again, a network layer function. EX2017 (Akl), ¶88; EX2018 (Tanenbaum) at 42-43. Finally, the IP QoS Scheduler module states in its name that it is associated with the network layer—also known as the IP layer. EX2017 (Akl), ¶88; EX2018 (Tanenbaum) at 47 (noting that layer 3 may be known as the Internet layer or the IP layer in some protocol stack models). Further, the function of the IP QoS Scheduler module is to “segregate a single IP packet stream comprising multiple IP QoS types into distinct QoS streams,” again, a function explicitly associated with layer 3. EX2017 (Akl), ¶88; EX2018 (Tanenbaum) at 42-44.

Thus, because the virtual MAC interface of the ’198 patent must sit at layer 2 of a protocol stack, and because the structures of Chincholi’s OMMA identified in the Petition must sit at layer 3, the Petition does not demonstrate that Chincholi discloses the virtual MAC interface of the ’198 patent.

2. Chincholi does not disclose a “resource monitoring interface” that “provides information regarding the first and second bandwidth availabilities”

The Petition fails to show that Chincholi discloses a “resource monitoring interface” that “provides information regarding the first and second bandwidth availabilities” for at least two reasons. First, Chincholi’s disclosure is contrary to the proper interpretation of the “bandwidth availabilities” term—agreed to by both parties in the district court—that the relevant bandwidth availabilities are those that are “current,” while Chincholi only discloses reporting historical metrics and averages. Second, applicant repeatedly made clear in the prosecutions of the ’198 patent and its family members that the bandwidth availabilities information had to have a capacity to be reported directly from the actual PHY interfaces in the PHY layer to the processing interface that sat in layer 2 of a protocol stack—and that this distinguished the claimed inventions from the prior art. Meanwhile, Chincholi does only what the prior art there did—and receives bandwidth availability information indirectly, in structures that sit in layer 3 of the protocol stack. Therefore, Chincholi does not disclose the claim limitation “information regarding the bandwidth availabilities of the first and second wireless transceivers”—nor does it disclose the “resource monitoring interface” that is fed this information at layer 2.

a. Chincholi does not disclose feeding back information regarding “current” bandwidth availabilities

As explained above in Section III.3, in the district court, the parties agreed that the “information regarding the bandwidth availabilities of the first and second wireless transceivers” refers to “current” bandwidth availabilities. *See* EX1001, 5:11-15 (“determin[ing] device availability” “involves a determination at the PHY layer as to the *actual availability* of the initially assigned transceiver resources”); EX2017 (Akl), ¶¶61; EX2021 (Mahon Decl.), ¶¶73.

The Petition asserts that this limitation is covered by Chincholi’s “feedback based routing” mode. Pet. at 25-28 (citing EX1005, [0139]). But a POSITA would understand that Chincholi’s “feedback based routing” mode provides historical feedback statistics. EX1005 at [0141] (“feedback metrics” reflect “average state of the system”); [0161] & Table 2 (describing “average” metrics); EX2017 (Akl), ¶¶91. Because historical statistics do not constitute “current” bandwidth availabilities, a POSITA would further understand that historical feedback statistics do not provide the same information as the bandwidth availability information recited by the claim. EX2017 (Akl), ¶¶91. Thus, the Petition fails to show that Chincholi discloses “current” bandwidth availabilities, under the parties’ agreed understanding of the claim term. This alone is sufficient to demonstrate that Chincholi does not disclose the “bandwidth availabilities” limitation, and that the Petition fails.

b. Chincholi does not disclose a capacity to feed back information directly from actual MAC and PHY interfaces, nor a resource monitoring interface that can receive that feedback

As described above, the intrinsic record compels a POSITA to understand that the information regarding the bandwidth availabilities of the recited transceivers is able to be communicated directly from either the actual MAC interfaces or the actual PHY interfaces to a resource monitoring interface. *See supra*, Section III.3. This is because the processing interface—where the bandwidth information is communicated—is in a protocol stack layer adjacent to the actual PHY interfaces and in the same layer as the actual MAC interfaces. *Id.*; *see, e.g.*, EX2026 ('756 Patent File History) at 8, 8/15/2024 Preliminary Amendment and Applicant Remarks (“[E]ach actual MAC and *each actual PHY in a particular wireless networking device communicates directly with the processing layer to allow it to receive information regarding bandwidth availabilities* from the wireless transceiver associated with each MAC/PHY pair...”).

The Petition asserts that this limitation is met by the traffic shaping module, operating in “feedback based routing” mode, and as shown by Figures 28 and 29. Pet. at 26-28. As described above (Section VI.A.1.c.), the traffic shaping module “determine[es] the way a packet is routed,” a function associated with the network layer. EX2017 (Ak1), ¶¶88, 92; EX2018 (Tanenbaum) at 42-44. Figure 7 of

Chincholi makes this even clearer, noting that OMMA’s “‘Feedback-Based’ scheme implies that OMMA at the transmitter distributes packets per IP flow across RATs based on feedback from lower layers i.e. MAC/PHY”—and thus, that OMMA sits above the MAC and PHY layers in the network layer. EX1005, Fig. 7; EX2017 (Akl), ¶92.

Because OMMA’s traffic shaping module sits in the network layer, there is no way for bandwidth availability information to be communicated directly from actual PHY interfaces (in the physical layer—layer 1) to the OMMA’s traffic shaping module (two layers away the network layer/layer 3). EX2017 (Akl), ¶92; EX2019 (Basic Reference Model), § 7.5.4.2.2 (“Since the Reference Model permits direct interaction only between adjacent layers, the network-entity cannot interact directly with the physical-entity. This interaction is thus described through the Data Link Layer which intervenes transparently to convey the interaction between the Network Layer and the Physical Layer.”).

Because the intrinsic record makes clear that the bandwidth availability information must have a capacity to be communicated directly from the actual PHY interfaces in the physical layer (*see supra*, Section III.3)—and because Chincholi does not have a capacity to receive bandwidth availability information directly to the OMMA from the physical layer, the Petition fails to show that Chincholi discloses “information regarding the bandwidth availabilities of the first and second wireless

transceivers.” EX2017 (Akl), ¶93. For the same reasons, Chincholi’s traffic shaping module, sitting in layer 3, also does not constitute the claimed “resource monitoring interface” that receives the bandwidth availability information from the physical layer. *Id.*

Moreover, while the intrinsic record makes clear that the “information regarding bandwidth availabilities” of claim 1 must be able to be communicated directly from the actual PHY interfaces (in layer 1) as well as the actual MAC interfaces (in layer 2) to the resource monitoring interface, the ’198 patent also claims these alternative capabilities explicitly. Those claims recite respectively, “The method 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*,” and “The method 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*.” EX1001, 13:24-33. Claim 15 in particular requires that the bandwidth availability information be “received by the resource monitoring interface *directly from* [the] actual PHY interfaces.” *Id.*, 13:24-28. This means that the resource monitoring interface must be in a layer adjacent to the actual PHY interfaces in layer 1—i.e., the resource monitoring interface must be in layer 2.

EX2017 (Ak1), ¶93. Meanwhile, Chincholi’s OMMA and its feedback based routing components all sit in layer 3, and cannot be adjacent to the actual PHY interfaces—nor can they receive feedback directly from the physical layer. *Id.*, ¶¶92-93; EX2019 (Basic Reference Model), § 7.5.4.2.2. Therefore, Chincholi—in addition to failing to disclose this bandwidth availabilities information limitation of claim 1—also does not disclose dependent claim 15.

3. Chincholi does not disclose a “virtual MAC interface being configured to” perform claimed functions “in a manner transparent to any layer of the wireless networking devices”

The Petition has not established that Chincholi discloses a “virtual MAC interface configured to” perform claimed functions “in a manner transparent to any layer of the wireless networking devices.” *See* Pet. at 28-29. These functions include: the creation of associations between the recipient and the recited actual MAC and PHY interfaces (claim 1[g]) and using “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” (claim 1[h]). EX1001, 12:48-57.

In each of these instances, the prescribed functions are recited as being performed “in a manner transparent to any layer of the wireless networking device above the processing interface.” EX1001, 12:45-47. According to the construction agreed by the parties in the district court, this means that these claimed functions are

performed “in a manner where any protocol stack layer of the wireless networking device above the processing interface is unaware of the operation of the processing interface.” EX2020 at 2.

The Petition attempts to demonstrate that Chincholi discloses these transparent operations by pointing to a mode in Chincholi disclosed as being transparent. Chincholi’s transparent mode is disclosed in a single sentence and described as one in which “[t]he OMMA layer may be transparent in that it distributes and/or combines packets from different RATs and forward the packets to the IP layer” without the inclusion of an additional header. EX1005, [0192], [0126]; *see* Pet. at 28-29; EX1002, ¶106. But as explained above, declining to add additional headers does not render the communication transparent (i.e., such that the higher layers are unaware of the lower layers’ operation). EX2017 (Akl), ¶¶80, 95. Nor does Chincholi’s discussion of its transparent mode explain how any equivalent functions would be performed transparently. Pet. at 29-30 EX1002, ¶¶107-111. This is insufficient to demonstrate that the various functions (claims 1[g]-1[h]) are in fact performed transparently, or that Chincholi achieves the transparent bandwidth decision making of the ’198 patent, achieved by obscuring the addresses and operation of the actual MAC and PHY layers to the upper layers. EX1001, Abstract; EX2017 (Akl), ¶96.

This particular manner of achieving transparency—through the use of the virtual MAC interface—is incorporated into the claim limitations reciting the functions that must be performed by the virtual MAC interface “in a manner transparent to any layer of the wireless networking device above the processing interface.” EX1001, 12:42-57; EX2017 (Akl), ¶97. Therefore, regardless of whether Chincholi discloses transparency in some respect, it does not disclose transparency achieved by the processing interface of the ’198 patent. *See* Section VI.A.2; EX2017 (Akl), ¶97. This is what is claimed and what is required.

Moreover, as described above, the processing interface must be located in layer 2 of the protocol stack. *See supra*, Section III.3; Section VI.A.1.a; Section VI.A.2.b. The Petition cites to Chincholi’s statement that “[t]he OMMA layer may be transparent in it distributes and/or combines packets from different RATs and forwards the packets to the IP layer.” Pet. at 28-29 (citing (EX1005 [0192], [0126])). As discussed above, distribution of packets is a function that takes place at the network layer, or layer 3 of the protocol stack. EX2017 (Akl), ¶¶80, 98; EX2018 (Tanenbaum) at 42-44. Because Chincholi discloses transparency only at a layer above layer 3—not at a layer above layer 2—it does not disclose transparency at any layer above the processing interface, as the processing interface of the ’198 patent is located in layer 2. *See* EX2023 (’105 patent FH) at 34, 2/5/2024 Third Preliminary Amendment and Applicant Remarks (applicant statements that claimed functions

were “transparent to the layers of the wireless networking device above its MAC/PHY interfaces”); EX2017 (Akl), ¶98; *see also* Section VI.A.1.c.

The Petition, by asserting Chincholi discloses transparency generally, when what is required is transparency achieved by a virtual MAC interface, fails to demonstrate that any claim is unpatentable. Further, the Petition does not disclose a processing interface at layer 2—or transparency at any layer above that layer. Because the Petition makes no attempt to show that Chincholi discloses the processing interface of the ’198 patent and its claimed transparent functions, Petitioners have failed to meet their burden.

B. The Petition Does Not Establish that Chincholi in View of Clegg Renders Any Challenged Claim Unpatentable

The Petition makes no argument that Clegg supplies any limitation relevant to the sole independent claim—claim 1, nor claims 2-30. Therefore, the Petition fails on Chincholi alone. In assessing the asserted combinations, it bears emphasizing that Chincholi is the only reference relied on for the limitations reciting “virtual MAC interface” (Section VI.A.1.), a resource monitoring interface (Section VI.A.2), a “virtual MAC interface configured to” perform claimed functions “in a manner transparent to any layer of the wireless networking device[s]” (Section VI.A.3), and utilization of a portion of transceiver bandwidth by one wireless networking device that “does not prevent” another wireless networking device from

using remaining bandwidth (Section VI.A.4). Clegg, as a secondary reference, is not asserted to disclose these limitations, or indeed, any limitation of claim 1 (along with 2-17). Consequently, the Petition fails without even reaching the asserted combination or secondary reference. In addition to failing to meet its burden to demonstrate the claim limitations described above in Section V.A, for the claims where Clegg is asserted, the Petition also fails to demonstrate that a POSITA would have been motivated to combine Chincholi with Clegg, or that a POSITA would have had a reasonable expectation of success in so doing.

The Petition does not establish that a POSITA would have modified the combination of Chincholi with Clegg (EX1009). Specifically, the Petition contends that a POSITA would understand Chincholi's teaching of monitoring available resources and responding to unavailable bandwidth channels could be "enhanced" by Clegg's teaching of addressing and mitigating "carrier specific interference within bandwidth channels." Pet. at 10-12.

However, the Petition fails to provide sufficient facts or evidence to support this conclusion, and additionally fails to address evidence of fundamental, contradictory differences between the references that would discourage a POSITA from making the proposed combination. This, again, is impermissible hindsight that uses the '198 patent's claims as a roadmap. *See Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056 at 1068-70 (Fed. Cir. 2018).

The Petition and Dr. Almeroth claim that combining Clegg with Chincholi be done “without technical challenge.” Pet. at 12; EX1002, ¶79. This conclusory assertion is made in a single sentence without explanation. It ignores the fact that Clegg is directed to “[w]ireless communication under IEEE 802.11 standards utilizing carrier specific interference mitigation,” specifically, via the employment of “an ultra-wideband tuner.” EX1009 at Abstract; *id.*, 9:60-10:13. Chincholi does not make use of an ultra-wideband tuner; instead, it employs typical transceivers that communicate on single Wi-Fi bands under the prevailing wireless standards. See EX1005, [0118] (referencing 2.4GHz and 5 GHz bands); EX1006, [0057]; EX2017 (Akl), ¶115. The disclosures that the Petition ignore show that combining Clegg, and its ultra-wideband tuner, with Chincholi would necessitate extensive technical reworking, and consequently, a POSITA would not look to Clegg to modify Chincholi. EX2017 (Akl), ¶115.

VII. THE PETITION DOES NOT ESTABLISH THAT THE CLAIMS OF THE '198 PATENT ARE INVALID UNDER SECTION 101 OR 112

The Petition next argues that the '198 patent is invalid on the bases that it is directed to ineligible subject matter (Ground 2); that its claims are invalid for lack of adequate written description (Ground 3); and that its claims are invalid for indefiniteness (Ground 4). But, in each case, the Petition selectively represents the record and misapplies the law to reach its incorrect conclusions. In fact, in no case

does the Petition demonstrate that any claim is unpatentable. As with Ground 1, the Petition should be denied as to Grounds 2, 3, and 4.

A. The Petition Fails to Demonstrate that the '198 Patent Is Directed to Ineligible Subject Matter

The Petition asserts that the '198 patent does not claim patentable subject matter pursuant to 35 U.S.C. §101. Pet. at 66-76. Although Patent Owner agrees that the two-step framework set forth in *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208 (2014), controls the Petition's Section 101 argument, the agreement ends there. Indeed, the Petition fails to show under *Alice* step one that the challenged claims are directed to an abstract idea, nor does the Petition establish that the '198 patent's claims contain no inventive concept, largely because it ignores fundamental aspects recited in the challenged claims.

1. The Claims Recite a Specific Improvement to a Conventional Wireless Networking System, Including in the Context of Protocol Stacks

The Petition's argument that the claims of the '198 patent recite nothing more than an abstract concept is based upon a highly selective view of the disclosure, divorced from the claims as a whole and the technical field on which those claims are based.

This is contrary to well-established precedent for applying the *Alice* framework, including that courts must "consider the claim as a whole" and "read it

in light of the specification.” *Packet Intel. LLC v. NetScout Sys., Inc.*, 965 F.3d 1299, 1309 (Fed. Cir. 2020) (citations omitted). It is also contrary to Federal Circuit guidance for applying *Alice* step one to software inventions, which explains that when “the focus of the claim[] is on the specific asserted improvement in computer capabilities” instead of “a process . . . for which computers are invoked merely as a tool,” the claim is not abstract. *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335-36 (Fed. Cir. 2016); *see also Uniloc USA, Inc. v. LG Elecs. USA, Inc.*, 957 F.3d 1303, 1306-07 (Fed. Cir. 2020). Further, when a claim is “directed to a technological solution to a technological problem,” it is not abstract. *SRI Int’l, Inc. v. Cisco Sys., Inc.*, 930 F.3d 1295, 1303 (Fed. Cir. 2019).

The Petition claims to “boil[] down” claim 1 to its “simple requirements,” and argues that “the Challenged Claims recite nothing more than a bare result: evaluate available network resources and select amongst them.” Pet. at 69. But in “boiling down,” Petitioners conveniently “boil away” the specific improvements of the ’198 patent. The Federal Circuit has repeatedly indicated that such boiling away important claim language in order to make a generic abstraction argument “all but ensure[s] the incorrect conclusion that the claims were drawn to an abstract idea.” *Contour IP Holding LLC v. GoPro, Inc.*, 113 F.4th 1373, 1379-1380 (Fed. Cir. 2024) (holding that “characteriz[ing] ... claims at an impermissibly high level of generality” led to a “generalized articulation of the claimed advance of the claims,

which all but ensured the incorrect conclusion that the claims were drawn to an abstract idea”); *see also Enfish*, 822 F.3d at 1337-1338 (improper to “describ[e] the claims at such a high level of abstraction and untethered from the language of the claims”). Rather, it is critical to “appreciate the functional improvement achieved” by the claimed invention. *Data Engine Techs. LLC v. Google LLC*, 906 F.3d 999, 1011 (Fed. Cir. 2018).

These specific improvements include the fact that it is the claimed virtual MAC interface that performs the supposedly “simple requirements” related to bandwidth allocation decision-making, and that it does so while sitting at the MAC sublayer of layer 2 of the protocol stack, making the bandwidth allocation decision-making transparent to layers above—all improvements that Petitioners’ characterizations ignore.⁶ This type of abstraction that ignores claim limitations and

⁶ That the virtual MAC interface sits at the MAC sublayer of layer 2 is consistent with Patent Owner’s proposed construction for “information regarding the bandwidth availabilities ... ,” which locates the elements of the processing interface, including the resource monitoring interface and the virtual MAC interface, in the MAC sublayer of the data link layer (layer 2) based on the intrinsic record’s demonstration that the actual PHY interfaces must be able to communicate directly with the processing interface, and that it thus must be in a layer adjacent to the

overgeneralizes the claims is “untethered” from the patent and does not meet step one of *Alice*’s framework. *TecSec, Inc. v. Adobe Inc.*, 978 F.3d 1278, 1294-95 (Fed. Cir. 2020) (quoting *Enfish*, 822 F.3d at 1337).

Though the specification clearly states that it “relates to wireless networks” (EX1001, 1:49-51), neither the Petition nor Dr. Almeroth offer explanation regarding the layer format through which a POSITA would view the invention. But, as explained above in Part II, a POSITA would understand that wireless networking systems of the time were conceptualized as a stack of layers or interfaces, each with a distinct purpose or function. Inserting a virtual MAC interface and resource monitoring interface into the MAC sublayer of layer 2, as in the ’198 patent, is a concrete improvement to a conventional wireless networking system. Indeed, the placement of a virtual MAC interface at layer 2—to allow transparent operations to higher layers—was an improvement over the prior art, such as Chincholi. *See supra*, Sections VI.A.1&3.

Further, by removing this language regarding the virtual MAC interface and its transparent operation, the Petition avoids having to address the technical improvements to the wireless networking system that the specification and

physical layer (layer 1) where the actual PHY interfaces are located. *See supra*, Section III.3.

prosecution history explain result from using those claimed features. But these are spelled out in the specification, which explains shortcomings in conventional wireless networking architectures in terms of range, coverage, and use of bandwidth (EX1001, 1:65-2:2), and describes that the claimed invention does not just improve performance generally, but that the use of the recited virtual MAC and PHY layers is what facilitates that result, through “enabl[ing] simultaneous allocation of multiple PHY resources for different signal types associated with different applications” (EX1001, 3:61-67). This is exemplified by Figure 1’s depiction of a single transceiver’s resources being shared by different applications at the same time, so no resources are wasted and latency is reduced. This type of granular allocation of bandwidth is achieved by defining the virtual MAC layer and resource monitoring interface. EX1001, 4:40-50. Moreover, the transparent nature of the operations as claimed is the result of the processing interface (and its components) being part of the MAC sublayer of the data link layer. *See* Section III.3, *supra*. Because of its location in the stack (closer to the actual physical resources), coupled with its virtual nature (which allows greater flexibility), the claimed system can make allocation decisions at a much more granular level and with reduced latency. EX2017 (Akl), ¶126.

The claims are thus directed to improving the performance of a conventional wireless networking system, not to using such a system as a tool for achieving some

unrelated data processing result. This alone distinguishes the string-cited cases in the Petition at pages 68-74. Rather, under precedent such as *Enfish*, this is exactly the type of subject matter that is patent eligible. *Enfish*, 822 F.3d at 1339 (claims directed to a “specific type” of structure functioning differently from conventional structure and “designed to improve” a computer function are not abstract); *see also Contour IP*, 113 F.4th at 1379-1380 (“disclosed technological means for obtaining a technological result” not abstract); *Packet Intel.*, 965 F.3d at 1308-1310 (affirming analysis that claims were not abstract where they were directed to “solving a discrete technical problem” and “specific technological solutions”); *Uniloc*, 957 F.3d at 1306-1309 (claims recited a specific component solving problem in conventional systems); *Mentone Soln’s LLC v. Digi Int’l Inc.*, Nos. 2021-1202 & 2021-1203, 2021 WL 5291802, at *6 (Fed. Cir. Nov. 15, 2021) (claim was patent eligible improvement to computer functionality, achieved through novel component that alters the normal function of the system); *SRI Int’l*, 930 F.3d at 1303-1304 (claims directed to “using a specific technique” “to solve a technological problem arising in computer networks” were not abstract).

Moreover, the cases cited in the Petition are readily distinguishable. First, in *Two-Way Media Ltd. v. Comcast Cable Communications, LLC*, the Federal Circuit’s ruling of patent ineligibility relied upon specific conclusions that the claim “d[id] not sufficiently describe how to achieve these results in a non-abstract way,” did not

“provide any parameters ... purportedly dictating how the information is being routed,” and was not directed to “any particular assertedly inventive technology for performing those functions.” 874 F.3d 1329, 1337-38 (Fed. Cir. 2017). This is not the case here, where the recited operations are largely performed by the virtual MAC interface, and positioned to do so in a transparent fashion.

Rather, the claims here are more like the invention in *Mentone*, where the Federal Circuit held the claims directed to dynamic resource allocation in radio communications to be patentable because the invention achieved its improvement through the addition of a novel component that altered the normal function of the system (“permitting additional multislot configurations for certain classes of mobile stations using extended bandwidth allocation”) and provided technological detail. *Mentone*, 2021 WL 5291802, at *1-6. There, the court reversed the district court because it overgeneralized the claimed invention and failed to mention the novel component in the claims—the same error Petitioners make here when ignoring the virtual MAC interface and its placement in the layer stack. *Id.* at *6.

Second, *Rady v. Boston Consulting Group* involved the use of conventional components to gather and store data. No. 2022-2218, 2024 WL 1298742, at *3 (Fed. Cir. Mar. 27, 2024). The court emphasized that the patent acknowledged that the claimed components were widely known and were to be used in their respective, conventional manners, and found the claims abstract because they did “not purport

to solve any technological problem,” used “existing imaging and blockchain technology in predictable ways,” and relied on existing tools without a purported improvement to the tools. *Id.* at *4. Unlike in *Rady*, the claims here recite an unconventional component, positioned in an unconventional way, resulting in an improvement to the functionality of otherwise conventional networking components.

Altogether, the Federal Circuit has made clear that claims like the ’198 patent’s, which recite “a specific technique ... to solve a technological problem arising in computer networks” are not abstract—especially where they involve a novel component that diverges from conventional usage. *SRI Int’l, Inc.*, 930 F.3d at 1303; *see also Uniloc*, 957 F.3d at 1306-1309. In keeping with this well-developed precedent, Ground 2 should be denied.

2. Bandwidth Allocation Decision-Making at the MAC Sublayer Is an Inventive Concept that Merits Patentability

The claimed use of a virtual MAC interface and resource monitoring interface, placed in MAC sublayer of Layer 2 of a network stack to provide for transparent bandwidth allocation decision making, is a concrete improvement to conventional wireless networking systems. It also serves as an inventive concept under step 2 of the *Alice* framework, though there should be no need to proceed beyond step 1.

The Petition repeats its prior arguments in attempting to marshal a record that the claims of the '198 patent contain no inventive concept, concluding that the claims “merely require conventional networking components that were well known to POSITAs.” Pet. at 75-77. But, as explained above, the claims recite a novel component performing functions in a novel way, from a novel location in the layer stack. *See supra*, Section VII.A.1. The Petition and expert declaration never mention layer stacks, or the fact that conventional networking systems like Chincholi made bandwidth allocation decisions at higher levels, limiting their ability to make decisions at a granular level and without latency—thus avoiding this fundamental concept of the claims. *See generally* Pet.; EX1002; EX2017 (Akl), ¶126.

Moreover, the Petition criticizes the '198 patent for not explaining how transparency is achieved, erroneously treating the transparency limitation as something that requires particular additional instrumentalities to achieve. Pet. at 76. A POSITA would understand that making bandwidth allocation decisions in the MAC sublayer of Layer 2 makes those operations transparent to the layers above, and that the claimed transparency is achieved by virtue of the inventive location of the processing interface. EX2017 (Akl), ¶¶124-125.

The claims' recitation of a virtual MAC interface and resource monitoring interface, placed so that they can make allocation decisions that are transparent to the layers above the MAC sublayer, is both inventive and concrete. *See, e.g., Trading*

Techs. Int’l, Inc. v. CQG, INC., 675 F. App’x 1001, 1004-06 (Fed. Cir. 2017) (affirming determination that a system that could be “distinguished ... from the routine or conventional use of computers or the Internet” met *Alice* Step 2). The Petition has failed to make the requisite showing under the *Alice* framework. Ground 2 should be denied.

B. The Petition Fails to Demonstrate that the ’198 Patent’s Claims Lack Adequate Written Description

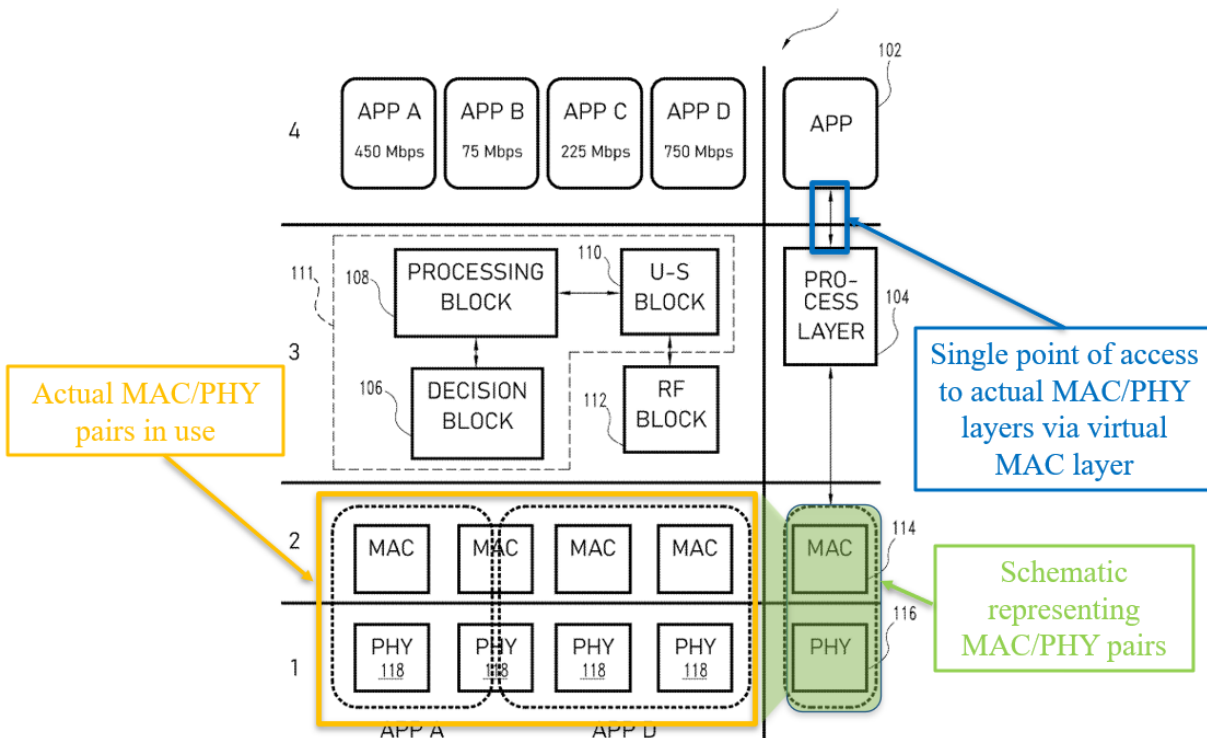
The Petition complains that a variety of limitations of the claims of the ’198 patent lack adequate written description (Ground 3). Pet. 78-88. “To satisfy the written description requirement the disclosure of the prior application must ‘convey with reasonable clarity to those skilled in the art that, as of the filing date sought, [the inventor] was in possession of the invention.’” *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306 (Fed. Cir. 2008) (emphasis omitted) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991)). The Federal Circuit has “analogized such a disclosure as ‘marking trails by making blaze marks on trees’ to ‘find one’s way through the woods’ of a specification such that a skilled artisan would be able to follow that trail and understand what the inventors had invented.” *Quake v. Lo*, 928 F.3d 1365, 1374 (Fed. Cir. 2019) (cleaned up). Under the written description standard, each claim element the Petition complains about is amply supported by the written description at the time of the application.

1. The claim term “transparent” is supported by adequate written description

The Petition asserts that the claim term “in a manner transparent to any layer... above the processing interface” is not supported by adequate written description, primarily because the word “transparent” does not appear in the specification. Pet. at 81-83. But the exact words of the claim need not be present in the disclosure for the claim to be supported by written description. *See, e.g., Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570 (Fed. Cir. 1996); *see also Purdue Pharma LP v. Faulding Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000). Rather, what is required is the understanding of a POSITA that the claim term is disclosed. *See, e.g., Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 927-28 (Fed. Cir. 2004). In this case, a POSITA would understand the claimed invention of the ’198 patent to include functionality “in a manner transparent to any layer ... above the processing layer.” Consistent with the construction Petitioners advance in the district court, POSITA at the time of the ’198 patent’s priority date would understand that “transparent” operations would be those “where any protocol stack layer ... above the processing interface is unaware of the operation of the processing interface.” EX2020 at 2; EX2017 (Akl), ¶96; *see also* Section III.2, *supra*.

Contrary to the Petition (at 82), this is also consistent with applicant statements characterizing the ’216 provisional on which priority is based. EX1017

(’591 patent FH) at 557 (8/8/2023 amendments remarks) (describing that ’216 provisional and its Figure 1 demonstrated that “[n]one of the interfaces of the wireless networking device above the processing interface are aware of the processing interface’s routing decision”); EX2017 (Akl), ¶129. A POSITA would recognize that the single point of access between the upper layers and the actual MAC/PHY pairs depicted in Fig. 1 would represent transparent operations, as layers above the single access point would be indifferent to the manner of implementation by the processing layer or below:



EX1001, Fig. 1 (annotations added); EX2017 (Akl), ¶¶96-97, ¶130; EX1017 at 556-563 (describing Figure 1 in detail). Thus, the disclosure of the ’216 provisional, via Figure 1, would give a POSITA the understanding that the invention of the ’198

patent would operate “in a manner transparent to any layer... above the processing interface.”

2. The claim term “evaluating data transfer characteristics” is supported by adequate written description

The Petition also complains that the claim term regarding “evaluating data transfer characteristics” is not adequately supported by written description, though it enumerates a list of explicit data parameters disclosed. Pet. at 83-84. Again, the Petition seems to expect “*ipsis verbis* disclosure”—which is not required. *See Fujikawa*, 93 F.3d at 1570; *Purdue Pharma*, 230 F.3d at 1323. Instead, a POSITA would have understood that data transfer characteristics refer to a known set of quality of service parameters, such as throughput, signal strength, bandwidth, delay, jitter, and loss. *See* EX2017 (Akl), ¶132 (citing EX2010 (Tanenbaum) at 405). A POSITA would know that these characteristics are present in any data transmission via a wireless networking system like that described in the ’198 patent’s disclosure. *Id.* In any event, the specification and the ’216 provisional suggest evaluation of data transfer characteristics through discussion of insufficient bandwidth, environmental conditions and range of wireless access, which inform data transfer characteristics such as delay/latency, jitter, packet loss, bandwidth, reliability, throughput, and received signal strength. EX1001, 5:11-18, 7:8-55, 9:20-45, Figs. 7 & 11; EX2017 (Akl), ¶133; *see also* EX1017 at 557-558. Once examined from the perspective of a

POSITA, it is clear that the '198 patent's disclosure adequately supports the "evaluating data transfer characteristics" claim term.

3. The claim term "resource monitoring interface" is supported by adequate written description

Petitioners claim the term "resource monitoring interface" lacks written description, but their expert opines that "[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." Pet. at 84-85; EX1002, ¶101. Given this statement, there should be no dispute that a POSITA could understand what a "resource monitoring interface" is. A POSITA's ability to understand the term as used—and not the ability to locate the precise phrase in the specification—is what is required by the written description requirement. *See Purdue Pharma*, 230 F.3d at 1323; *Fujikawa*, 93 F.3d at 1570. Thus, Petitioners' complaints about the specification (Pet. 89-90) are unavailing.

In any event, a proper review of the specification reveals that it discloses a resource monitoring interface that "feeds information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface," as recited in the claim. This capability is discussed at length in the specification, including various embodiments, carried out by the RF block.

See, e.g., EX1001, 3:50-55; 5:1-3; 8:38-42; *see also supra*, Section VI.A.2; EX2017 (Akl), ¶136.

Meanwhile, the specification makes clear that the RF block and virtual PHY interface (originally recited) perform a number of other unrelated tasks, including controlling “cycle times” and configuring buffer sizes. *E.g.,* EX. 1001, 5:66-6:3, Figs. 5A, 5B & 6. A POSITA would recognize that the RF block and virtual PHY layers can be programmed or “formed” to perform desired tasks and not others. EX2008 (Akl), ¶137. Rather than broadening claim disclosure (Pet. at 85), the amendment merely fine-tuned the claim to focus it upon the components programmed or formed to provide feedback about bandwidth availabilities and direct that feedback to the virtual MAC for decision-making. Ultimately, there is sufficient disclosure in the specification about what components are involved in the feedback operation such that the inventor clearly had possession of the subject matter of the claim. The amended term “resource monitoring interface” fairly defines a general subsystem that performs the monitoring role, and a number of embodiments of such subsystem are disclosed in the specification. EX2017 (Akl), ¶136. The specification satisfies Section 112 regarding the claim term “resource monitoring interface.”

4. The claim term “adapted to emit radio waves in first and second different bands of frequencies” is supported by adequate written description

The Petition complains that there is inadequate written description support for the claim element reciting “different bands of frequencies,” asserting that this limitation is supported “nowhere in the specification.” Pet. at 85-86. Like the Petition’s other written description complaints, this argument rests on demanding “*ipsis verbis* disclosure,” which is contrary to longstanding Federal Circuit precedent. *See, e.g., Fujikawa*, 93 F.3d at 1570.

Again, the Petition fails to examine the disclosure supporting the ’198 patent from the perspective of a POSITA. A POSITA at the time of the priority application would have understood that, no later than 2009, the prevailing WiFi standard (IEEE 802.11n) included the ability for Wi-Fi radios to emit radio waves on different bands of frequencies, such as 2.4 GHz and 5GHz. EX2017 (Akl), ¶139. A POSITA would further understand that the “multiple radios” of the ’198 patent, as shown by the multiple MAC/PHY pairs in Figure 1, represent an ability to “emit radio waves to different bands of frequencies.” *Id.*, ¶¶139-140. This is consistent with what Patent Owner expressed to the Office in the August 8, 2023 remarks. EX1017 at 556 (“On page two of the 10/30/2013 ’216 provisional, ‘Wi-Fi radios’ and ‘multiple radios’ are referenced.... Wi-Fi radios emit radio waves in different bands of frequencies such as, for example, 2.4 GHz, 5 GHz and 6 GHz.”); *see also* EX2021, ¶109

(Petitioners’ district court expert relying on same to express POSITA’s understanding). By repeated references to the Wi-Fi standard and multiple radios, a POSITA would have understood that the invention of the ’198 patent included transceivers adapted to emit radio waves in different frequency bands. There is no lack of written description.

5. Claim terms related to “creating associations” between a recipient and actual MAC/PHY interface are supported by adequate written description

The Petition asserts that there is not adequate written description for claim terms related to “creating associations” between actual MAC/PHY interfaces and “the recipient.” Pet. at 86-88. A POSITA would understand that, in a Wi-Fi system like that of the ’198 patent, “association” merely indicates that the two components are in radio range of each other and connect with each other. *See* EX2017 (Akl), ¶143; *see also* EX2010 (Tanenbaum) at 311. A POSITA would understand that a user has an association with the actual MAC and PHY layers. EX2008 (Akl), ¶143; *see also* EX1017 at 557. And a POSITA would have no trouble understanding that a “recipient” is the receiver of the data in a data transmission—here, the user or device engaging with the ’198 patent’s wireless system. EX2017 (Akl), ¶143; *see also, e.g.*, EX2010 (Tanenbaum) at 390, 463 (textbook using “recipient” to refer to entity receiving data transmission in multiple contexts). Yet again, the Petition

ignores the perspective of one of skill in the art to create purported inadequacies in written description support where there are none.

C. The Petition Fails to Demonstrate that the '198 Patent's Claims are Indefinite

The Petition claims that various limitations of the '198 patent's claims are indefinite. "A patent is indefinite 'if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.'" *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1340–41 (Fed. Cir. 2015) (quoting *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014)). But the Petition latches onto common and well-understood terms and ignores that a POSITA would have no trouble identifying the scope of the claims.

1. The claim term "partially simultaneously" is not indefinite

The Petition complains that the claim term "partially simultaneously" (claim 27) is indefinite because it is a term of degree. Pet. at 88-89.

But a POSITA would understand "partially simultaneously" to describe parallel transmissions taking place across a single transmission opportunity, or TXOP—with the TXOP itself providing objective bounds. EX2017 (Akl), ¶151; *see also* EX2010 (Tanenbaum) at 309. A POSITA would understand a parallel transmission to take place "partially simultaneously" where, in two parallel

transmissions taking place during a single TXOP, the transmission with less data to transmit finishes before the other transmission with more data. EX2017 (Akl), ¶152 (citing EX2010 at 309). In all, the Petition makes much out of nothing. A POSITA would have no trouble understanding the scope of the various claims that disclose “partially simultaneously.”

2. The claim term “partially satisfy” is not indefinite

The Petition asserts that the claim term “partially satisfy” is indefinite because “it is a term of degree and the patent fails to provide sufficient guidance for determining its scope.” Pet. at 90-91. But a POSITA would easily understand that any bandwidth availability that measurably contributed to a bandwidth requirement would “at least partially satisfy” that bandwidth requirement—more than sufficient guidance to understand the scope of the term. EX2017 (Akl), ¶160. Therefore, the Petition’s concern that “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” (Pet. at 89) is unfounded—all three would “partially” satisfy a bandwidth requirement of 750 Mbps. EX2017 (Akl), ¶160.

A POSITA would understand that, in order to meet quality of service requirements, an application would have a particular bandwidth requirement, for example, 225 Mbps, and that use of a bandwidth availability of 225 Mbps would

satisfy that requirement. *Id.*, ¶161; *see also* EX1017 at 559. However, a bandwidth availability could be 75 Mbps (or any number less than 225), and a POSITA would understand that its use by that application could constitute “partial satisfaction” of the 225 Mbps bandwidth requirement. *Id.*

In all, the Petition attempts to create an indefiniteness problem where none exists—a POSITA would understand what satisfaction of a bandwidth requirement meant, and also understand that a “partial” satisfaction would be any measurable contribution to meeting the bandwidth requirement.

VIII. CONCLUSION

The Petition does not establish that any of the challenged claims are unpatentable. Patent Owner’s claims should be confirmed.

Dated: March 17, 2026

Respectfully Submitted,

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WORD-COUNT CERTIFICATE

The undersigned certifies that the foregoing Patent Owner Response complies with the type-volume limitation of 37 C.F.R. § 42.24(a) and (b) and contains 15,337 words in 14-point Times New Roman font as calculated by the word count feature of Microsoft Office. This word count is inclusive of all text and footnotes but does not include the table of contents, table of authorities, certificates or service or word count, or appendix of exhibits or claim listing.

Dated: March 17, 2026

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CERTIFICATE OF SERVICE

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