

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 PGR2025-00069

Patent 12,250,564

**PATENT OWNER'S PRELIMINARY RESPONSE
UNDER 35 U.S.C. § 313 AND 37 C.F.R. § 42.207**

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Other Authorities

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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.

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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

I. PRELIMINARY STATEMENT

Pursuant to 37 C.F.R. § 42.207, Patent Owner XiFi Networks R&D, Inc. (“XiFi”) submits this Preliminary Response to the Petition for Post Grant Review (“PGR”) of U.S. Patent No. 12,250,564 (the “’564 patent”). Paper 3 (“Petition”). Petitioners Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Petitioners”) challenge the validity of claims 1-29 of the ’564 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); U.S. Patent No. 7,206,840 (“Choi”) (EX1016)¹; and U.S. Patent No. 9,055,592 (“Clegg”) (EX1009), collectively, “Ground 1.” Petitioners further challenge claims 1-29 of the ’564 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).

The Petition has not established that it is more likely than not that any of the challenged claims are unpatentable. Although Petitioners acknowledge their burden

¹ While listing Choi as EX1016 in the Petition, Petitioners did not file any EX1016 in this PGR, in violation of 37 C.F.R. § 42.63. Patent Owner refers to the public version of U.S. Patent No. 7,206,840.

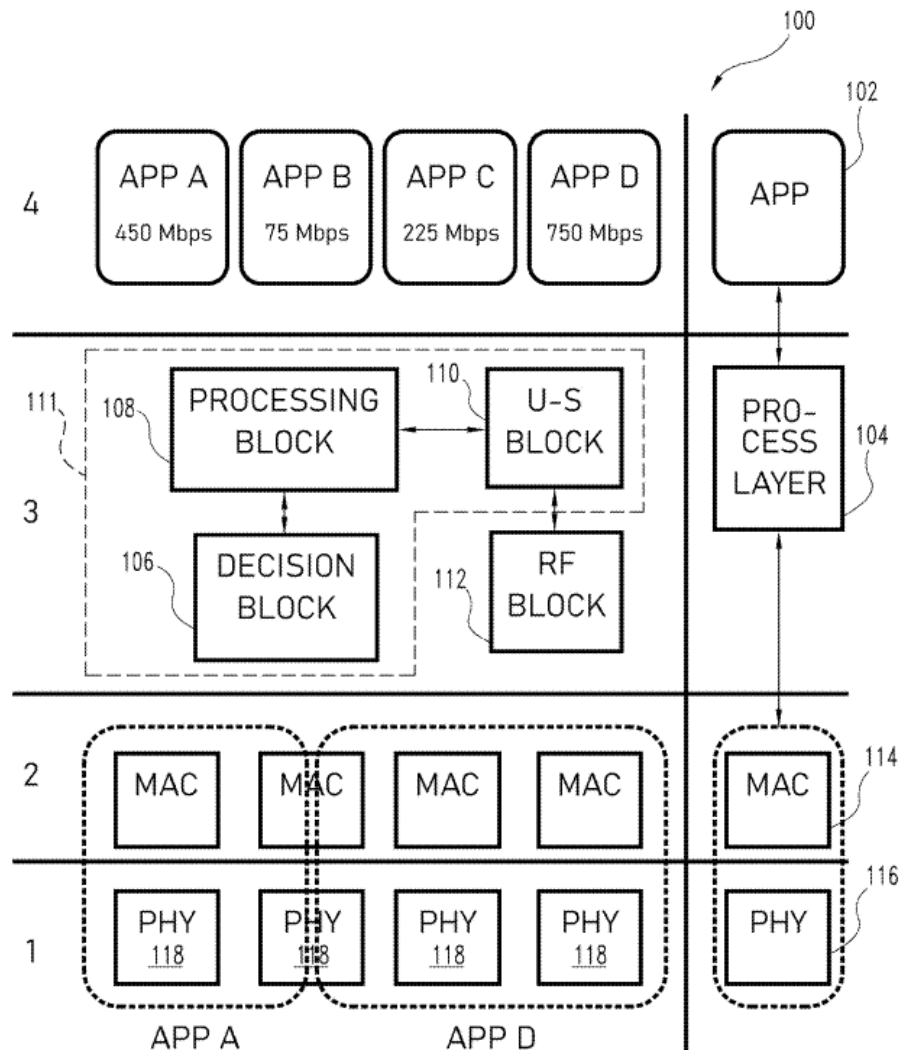
to demonstrate the presence of every element of the claims in the asserted combination, their offer of proof as to several key elements and limitations falls far short. As foreshadowed in Patent Owner's memorandum in support of discretionary denial (Paper 8), in these key areas, the Petition relies less upon the actual disclosures of the references that comprise Ground 1, and more upon interpretation and gap-filling from Petitioners' designated expert, Kevin Almeroth, Ph.D. 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. In addition, the Petition does not account for technical details of the secondary references that either teach away from combining each one with the primary reference, Chincholi, and/or make combination impractical without extensive modification. Moreover, the '564 patent relates to eligible subject matter, supports its claims with adequate written description, and recites claims that inform a person of ordinary skill in the art of their scope—thereby posing no issue under Section 101 or 112. Accordingly, Patent Owner requests that the Board deny institution of post grant review.

II. FACTUAL BACKGROUND OF THE '564 PATENT

The '564 patent was filed as U.S. Pat. App. No. 18/621,425 on March 29, 2024 and claims priority to provisional applications Nos. 61/897,216 and

61/897,219, both filed on October 30, 2013. The title of the '564 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 '564 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, 2:60-3:3, 4:30-5:30, 12:25-30, Figs. 1-3. Key aspects of the invention of the '564 patent include the use of the 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, which allows 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 '564 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 3:49-50. An exemplary component of the resource monitoring interface, the RF Block, is depicted as element 112. *Id.* at 3:51. Figure 1 also shows that the system includes various applications (102) with respective data needs. *Id.* at 3:19-21. It also includes a plurality of wireless transceivers which have associated pairs of actual MAC and actual PHY components (118). *Id.* at 3:61-67. The actual

MAC/PHY pairs recited by the claims send feedback information to the resource monitoring interface. *Id.* at 12:25-30.

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 4:38-60. 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 12:25-30.

The Petition challenges all 29 claims of the '564 patent: 1 independent claim (claim 1) and 28 dependent claims (claims 2-29). Claim 1 of the '564 patent recites:
[1.pre] A wireless networking device, comprising:

- [1.a] a processing interface that is connected to an application interface, the application interface being associated with a first application, the first application providing, when the wireless networking device is being used, a first data stream and having a first wireless bandwidth requirement;
- [1.b] first and second actual MAC interfaces connected to the processing interface;

[1.c] first and second actual PHY interfaces respectively connected to the first and second actual MAC interfaces;

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

[1.e] at least one virtual MAC interface and at least one resource monitoring interface formed in the processing interface that, during operation of the wireless networking device, feeds information regarding the bandwidth availabilities of the first and second wireless transceivers back to the at least one virtual MAC interface;

[1.f] wherein the processing interface is configured to, when the wireless networking device is being used, and in a manner transparent to any layer of the wireless networking device above the processing interface,

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

- [1.h] (b) identify at least one first and second portions of the first actual bandwidth of the first wireless transceiver, each one of the first and second identified bandwidth portions each having a set of given resources,
- [1.i] (c) evaluate the data transfer characteristics of the given resources of both the first and second identified bandwidth portions,
- [1.j] (d) if the data transfer characteristics of the first identified bandwidth portion are better than those of the second identified bandwidth portion, use the first wireless transceiver to transmit the first data stream to the recipient, without requiring disassociation of the recipient from either or both of the first and second actual MAC and PHY interfaces, using a subset of frequencies corresponding to only the given resources of the first identified bandwidth portion that are available for communication to thereby at least partially satisfy the first wireless bandwidth requirement of the first application, and
- [1.k] (e) if the data transfer characteristics of the second identified bandwidth portion are better than those of the first identified bandwidth portion, use the first wireless transceiver to transmit the first data stream to the recipient, without requiring disassociation of the recipient from either or both of the first and second actual MAC and PHY interfaces, using a subset of frequencies corresponding to only the given resources of the second

identified bandwidth portion that are available for communication to thereby at least partially satisfy the first wireless bandwidth requirement of the first application, and

[1.1] wherein, when the wireless networking is being used, the wireless networking device's utilization of the first and second identified bandwidth portions do not prevent any wireless networking device from utilizing a range of frequencies corresponding to the remaining portion of the bandwidth availability of the first wireless transceiver for data transmission or reception purposes at the same time that the first or second identified bandwidth portions are being used for data transmission purposes.

Ex. 1001, 12:5-13:13.

III. CLAIM CONSTRUCTION

Petitioners do not request construction of any claim terms from the '564 patent. Pet. at 12-13. Patent Owner does not believe that any claim terms require express construction to deny institution. Accordingly, the claims should be given their ordinary and customary meaning in light of the specification and prosecution history, as understood by a person of ordinary skill in the art. 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005).

IV. LEVEL OF ORDINARY SKILL IN THE ART

For the purposes of these preliminary 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." Patent Owner also does not waive any argument regarding the proper level of skill and further reserves the right to later advance additional arguments.

V. THE PETITION DOES NOT ESTABLISH THAT THE APPLIED REFERENCES MORE LIKELY THAN NOT RENDER THE CHALLENGED CLAIMS UNPATENTABLE.

The Petition does not establish that it is more likely than not that Chincholi in combination with Choi and Clegg (Ground 1) discloses all of the limitations of any '564 patent claim, or that a POSITA would be motivated to combine the references. The Board should not institute trial for many reasons including, but not limited to:

A. Chincholi does not disclose the claimed "virtual MAC interface." *See* Section V.A.1.

B. Chincholi does not disclose the claimed "resource monitoring interface." *See* Section V.A.2.

C. Chincholi does not disclose the claimed “processing interface” acting “in a manner transparent to any layer of the wireless networking device above the processing interface.” *See* Section V.A.3.

D. Chincholi does not disclose the claimed utilization of a “bandwidth portions do not prevent any wireless networking device from utilizing ... the remaining portion of bandwidth availability.” *See* Section V.A.4.

E. Chincholi does not disclose the claimed use of a “wireless transceiver to transmit the first data stream to the recipient, without requiring disassociation of the recipient from ... MAC and PHY interfaces...” *See* Section V.A.5.

F. The Petition does not establish it is more likely than not that a POSITA would have modified Chincholi with either Choi or Clegg. *See* Section V.B.

The Board should not institute trial at least for these reasons.

A. The Petition Does Not Establish it Is More Likely than Not that Chincholi Discloses Limitations Common to All Challenged Claims.

The Petition has not it is more likely than not that Petitioners will prevail on any claim challenged in Ground 1 because the 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. All other claims depend from claim 1, either directly or indirectly, and therefore, the Petition

has also failed to demonstrate that Chincholi in combination with Choi and/or Clegg discloses any challenged claim.

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

The Petition has not established it is more likely than not that Chincholi discloses “a virtual MAC interface.” *See* Pet. at 25-28.

Independent claim 1 (from which all other challenged claims depend) recites that the processing interface includes a virtual MAC interface. EX1001, 12:25-27.

The Petition asserts that Chincholi’s OMMA layer “includes the claimed ‘virtual MAC interface,’” because it “aggregates multiple MAC interfaces,” and “because it transparently ‘distributes and/or combines’ packets between the IP layer and the RATs.” Pet. at 26. The Petition’s arguments, however, fail to demonstrate disclosure of a “virtual MAC interface”: first, because nothing in Chincholi is “virtual”; and second, because the Petition’s functional comparison—even were this an appropriate means of demonstrating invalidity—fails to actually show alike functions.

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

The Board should deny institution because the Petition does not address why Chincholi teaches the “virtual” limitation. Petitioners’ expert, Dr. Almeroth, 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.” EX1002, ¶102 (emphasis added); *see also* Pet. at 26. 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* EX2008 (Akl), ¶49. 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 25-28; EX1002, ¶¶100-104. By declining to point to any reasonable definition of what it means to be “virtual,” the Petition avoids committing to an objective basis for assessing its argument.

In fact, “virtual” had a well-known plain and ordinary meaning at the time of the ’564 patent’s invention: that which is not physical or tied to the physical world, but rather software-based, abstract, or logical. EX2008 (Akl), ¶50; *see also* EX2009 (2012 American Heritage Dictionary) (“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”). Likewise, a “virtual MAC address” or a “virtual MAC interface” is a software or logical construct that has an address that can be changed, and which need not be static. EX2008 (Akl), ¶50. In contrast, and in the context of the ’564 patent, a POSITA would understand that the “actual” MAC interface is one whose address is permanent and installed by the manufacturer, i.e., physical. *See*

EX2008 (Akl), ¶51 (quoting EX2010 (Tanenbaum) at 339 (“MAC addresses are installed by the manufacturer and guaranteed to be unique worldwide...”)).

Because the virtual MAC interface sits between the actual MAC interface and higher layers, such as applications, a POSITA would understand that the virtual MAC interface obscures the actual MAC interface’s address from higher layers via its programmable, non-static—virtual—address. *Id.*; *see also* 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 ...”); *see also 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”). Packets are passed up the protocol stack from the virtual MAC interface with the virtual MAC address in the payload. EX2008 (Akl), ¶52.

Nothing in Chincholi describes or suggests a “virtual” MAC interface, properly understood. *Id.*, ¶¶53-54. 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 actual MAC address), taking multiple inputs and sending them out as one output. EX1005 at [0137]-[0143],

[0383]; EX2008 (Akl), ¶53.² In doing so, Chincholli'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. EX2008 (Akl), ¶54; EX1005, [205] (OMMA layer uses "device address").

In contrast, in the '564 patent, packets are addressed using the virtual MAC address; upper layers do not see the actual MAC addresses. *See* EX1001, 4:46-49; EX2008 (Akl), ¶55. This enables a number of recited functions and limitations discussed below in Sections V.A.2, V.A.3, V.A.4, and V.A.5. Ultimately, nothing in the four corners of Chincholi purports to characterize the OMMA as "virtual"; consequently, the Petition's attempt to map Chincholi's OMMA onto the '564 patent's virtual MAC interface fails because it ignores the requirement that the interface be, in fact, "virtual."

² In this regard, Chincholi is no more pertinent than the art of record, such as U.S. Patent No. 9,560,656 to Damnjanovic ("'656 patent," EX2012). The '656 patent uses a module called a "DL Multi-link Scheduler," which, along with a "DL WLAN Flow Control," operates above the MAC layer, like Chincholi's OMMA, to distribute packets based on quality-of-service considerations and system fairness. EX2012 ('656 patent), 12:67-13:16.

b. The Petition’s functional equivalents arguments are legally inappropriate and factually incorrect.

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 26; EX1002, ¶102 (emphasis added). 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.

Next, 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 are ultimately sent or received by the actual MAC-PHY pairs.” Pet. at 26 (quoting EX1002, ¶102). Dr. Almeroth gives no further explanation in his declaration than the identical text contained in the Petition. He does not explain what “virtualizing” is, why it is equivalent to “virtual,” or why a POSITA would understand Chincholi’s OMMA layer as being “virtual.”

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 '564 patent as the “decision,” “processing,” and “ultra-streaming” blocks. Pet. at 25; EX1002, ¶100. 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.³ But this approach is improper for multiple reasons.

First, this type of functional analysis is not a substitute for identifying a literal virtual MAC interface. Including some of the same functionality does not mean that

³ The Petition conflates the virtual MAC interface of claim 1 with certain aspects of the particular embodiment described in the specification with regard to Figure 1. Claim 1 is not limited to the Figure 1 embodiment, as demonstrated by the fact that each of dependent claims 4-6 claim one of the three blocks the Petition identifies. *See Kinik Co. v. Int’l Trade Comm’n.*, 362 F.3d 1359, 1364 (Fed. Cir. 2004) (“[W]hen the specification describes the invention in broad terms, accompanied by specific examples or embodiments, the claims are generally not restricted to the specific examples or the preferred embodiments unless that scope was limited during prosecution.”); *Nazomi Commc’ns, Inc. v. Arm Holdings, PLC*, 403 F.3d 1364, 1370 (Fed. Cir. 2005) (“[L]imitations stated in dependent claims are not to be read into the independent claim from which they depend.”).

the OMMA layer *is* a “virtual MAC interface.” Both the sun and a pot on a stove will melt ice; that does not mean the pot on a stove is the sun. *Application of Wilson*, 312 F.2d 449, 451 (C.C.P.A. 1963) (“The mere production of the same end result is not determinative of the obviousness of structure and does not support the board’s conclusion of unpatentability.”); *Application of Ruff*, 256 F.2d 590, 597 (C.C.P.A. 1958) (“That two things are actually equivalents, in the sense that they will both perform the same function, it not enough to bring into play the rule that when one of them is in the prior art the use of the other is obvious and cannot give rise to patentable invention. One need not think very hard to appreciate that the vast majority of patentable inventions perform old functions.”); *cf. In re Huai-Hung Kao*, 639 F.3d 1057, 1067 (Fed. Cir. 2011) (substitution of one component for another without reasoning cannot support obviousness finding); MPEP § 2144.06 (“In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art....”).

Second, even were it appropriate to compare Chincholi to the Figure 1 embodiment of the virtual MAC interface, Chincholi is missing important functionality, and the Petition’s functional comparison fails. For example, the virtual MAC interface of the ’564 patent controls the operation and bandwidth allocation decisions with respect to the actual MAC layers below it. EX1001, 2:65-3:1, 3:28-50, 10:35-39; EX2008 (Akl), ¶57. 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 ’564 patent *are* directed by the virtual MAC interface. EX2008 (Ak1), ¶57.

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 ’564 patent associates with the virtual MAC interface.” Pet. at 27 (citing EX1002, ¶103). But 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 ’564 patent’s decision block. Pet. at 27-28; EX1002, ¶104; 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, 3:31-34; EX2008 (Ak1), ¶59. The Petition and Dr. Almeroth make no attempt to describe why these functions are equivalent—because they are not equivalent. EX2008 (Ak1), ¶59.

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 28; EX1002, ¶104), this is not the same as the processing block of the ’564 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, 3:31-36; EX2008 (Akl), ¶60. 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. EX2008 (Akl), ¶60.

Finally, the Petition attempts to equate the traffic shaping module of Chincholi with the ultra-streaming block of the ’564 patent. Pet. at 28; EX1002, ¶104. 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 ’564 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, 3:36-48; 4:54-60. The Petition does not and cannot explain how the traffic shaping module of Chincholi performs packetizing. EX2008 (Akl), ¶61. 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 '564 patent to which the Petition compares them.

In all, the OMMA layer of Chincholi is missing both the form and function of the virtual MAC interface of the '564 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. EX2008 (Akl), ¶¶56, 58.

2. Chincholi does not disclose a “resource monitoring interface.”

The Petition also argues that Chincholi discloses the “resource monitoring interface,” via the OMMA Controller’s Feedback Device Classifier module. Pet at. 28-31 (citing EX1005, [0205]).⁴ But the Petition fails for several reasons.

⁴ The Petition and Dr. Almeroth assert that the amendment to include the claim term “resource monitoring interface” broadened the scope of the claim relative to the term “virtual PHY interface.” Pet. at 25-26; EX1002, ¶100. Although Patent Owner disagrees that this is a fair or comprehensive characterization of the

First, the Petition fails to demonstrate that Chincholi discloses “feed[ing] information ... back to the at least one virtual MAC interface.” EX1001, 12:28-30. The Petition and Dr. Almeroth assert that Chincholi’s A2 interface collect “feedback statistics,” which are then passed on to the “OMMA Scheduler.” Pet. at 28-31; EX1002, ¶¶105-108. But the Petition and Dr. Almeroth make no attempt to explain how the OMMA Scheduler, or any other structure of Chincholi, qualifies as a virtual MAC interface, and rather just assume that the OMMA Scheduler serves that role. *Id.* But, as explained above, the OMMA layer of Chincholi is not “virtual,” and it does not align to the virtual MAC interface of the ’564 patent. *See supra*, Sections V.A.1; EX2008 (Akl), ¶62.1.

Second, the Petition and Dr. Almeroth wrongly assert that a POSITA would understand that the resource monitoring interface “merely requires a component capable of receiving *feedback statistics* regarding the available resources of the wireless transceivers.” Pet. at 28 (quoting EX1002, ¶105) (emphasis added). The specification makes no reference to “statistics”; rather, it discloses a requirement to share information about the current “bandwidth availability” of the relevant

amendment, assessing the relative scope of the amended claims is unnecessary for determining that the Petition does not show any claim is more likely than not unpatentable and that institution should be denied.

resources. EX1001, 3:40-48; 4:54-60; 8:27-32; EX2008 (Akl), ¶62. Indeed, the claim recites that the resource monitoring interface “feed[s] information regarding the bandwidth availabilities of the first and second wireless transceivers,” and also that the processing interface is configured to use identified portions of bandwidth that are “available for communication” depending upon which one has better data transfer characteristics. EX1001 at 12:28-30, 12:48-13:4; EX2008 (Akl), ¶62.

A POSITA would read the claim as a whole and in light of the specification. *See, e.g., Phillips*, 415 F.3d at 1312-1313 (claims given “ordinary and customary meaning” from the perspective of a POSITA considering “in the context of the particular claim” and “in the context of the entire patent, including the specification”). In possession of the entire claim, a POSITA would understand that historical feedback statistics do not provide the same information as the bandwidth availability information recited by the claim. EX2008 (Akl), ¶62. The Petition has only shown that Chincholi’s OMMA can receive statistics about past operation of the RATs; there is no disclosure of any current availability. *Id.*; *see also* EX1005 at [0141] (“feedback metrics” reflect “average state of the system”); [0161] & Table 2 (describing “average” metrics). Thus, the Petition fails to show that Chincholi discloses the “feeds information” function of the “resource monitoring interface” of the ’564 patent.

In short, the Petition and Dr. Almeroth fail to show that Chincholi discloses any “resource monitoring interface” that (1) feeds current bandwidth availability information (2) to a virtual MAC interface. Without these elements of the claim limitation, the Petition fails to show it is more likely than not that Chincholi discloses the “resource monitoring interface” of claim 1.⁵

⁵ The Petition’s effort to map Chincholi’s Feedback Device Classifier module fails for an additional reason, at least as to dependent claim 7. Dependent claim 7 recites that the resource monitoring interface “includes an RF block.” EX1001, 13:29-30. As the Petition itself recognizes, the specification states that “the RF block 112 forms a virtual PHY layer.” *Id.*, 3:51. (The Petition flagrantly rewrites this passage to insert the word “may” into the middle of the sentence, without any basis. Pet. at 26.) To the extent the resource monitoring interface includes an RF block, which itself forms a virtual PHY layer, the Petition has failed to show that Chincholi discloses any such layer. In fact, in other IPR petitions against other members of the ’564 patent’s family, Petitioner has conceded that Chincholi has no such disclosure; that is why Petitioner resorts to another reference, Riggert, to supply the missing element. *See, e.g., Samsung Electronics, Co. v. XiFi Networks R&D, Inc.*, IPR2025-01206, Paper 3 (Petition) at 30-33. Petitioner has not done so here.

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

The Petition has not established it is more likely than not that Chincholi discloses a “processing interface configured to” perform claimed functions “in a manner transparent to any layer of the wireless networking devices.” *See* Pet. at 31.

The claims of the '564 patent recite a “processing interface.” The processing interface is introduced in claim 1, where it is described as: containing “at least one virtual MAC interface”; and configured to perform numerous functions. EX1001, 12:25-13:4. While additional functions for the processing interface are claimed in dependent claims 16, 18, 20, and 22, all claims include those recited in claim 1, which generally include: the creation of associations between the recipient and the recited actual MAC and PHY interfaces (claim 1[g]); identifying a portion of the bandwidth of the first wireless transceiver (claim 1[h]); evaluating the data characteristics of the identified bandwidth portions (claim 1[i]); and using that portion that is not unavailable to transmit the recited data stream to the recipient (claims 1[j] and 1[k]).⁶

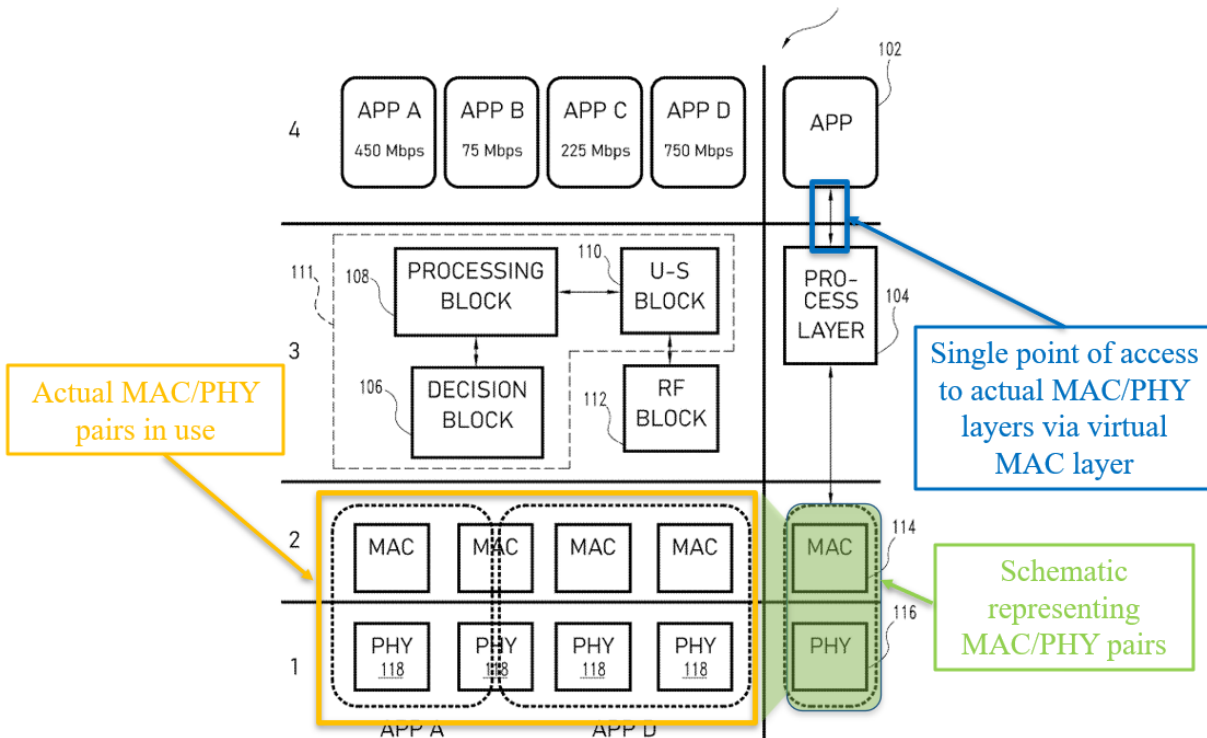
⁶ These claimed functions are described generally for context/identification and are not intended as a substitute for the entirety of the claim language.

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, 12:32-34. 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 “the 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, [0126], [0192]; *see* Pet. at 31; EX1002, ¶110.

Chincholi’s transparent mode makes no reference to the specific functions claimed in the ’564 patent as being performed transparently. Moreover, the Petition does not explain how a “POSITA would have recognized” that this sparse disclosure of Chincholi’s “transparent mode” corresponds to the various functions claimed in the ’564 patent. Pet. at 32; EX1002, ¶¶111-131. This is insufficient to demonstrate that the various functions (claims 1[g]-1[k]) are in fact performed transparently.

Importantly, the Petition misses the crux of limitation 1[f] and a fundamental point of the invention of the ’564 patent: it is based upon the use of resource monitoring interface that provides bandwidth availability feedback to facilitate transparent bandwidth decision making, obscuring the addresses and operation of the actual MAC and PHY layers to the upper layers. EX1001, Abstract; EX2008

(Akl), ¶64. Indeed, through the functioning of the virtual MAC layer, the higher layers receive the information that they are interacting with only one MAC/PHY pair—the virtual MAC interface—rather than the many actual MAC/PHY pairs below the virtual MAC interface. EX1001, Fig. 1; EX2008 (Akl), ¶64.



EX1001, Fig. 1 (annotations added); EX2008 (Akl), ¶64; *see also* EX2011 ('208 patent) at Abstract, 6:39-40.

This particular manner of achieving transparency—through the use of the virtual MAC interface—is incorporated into the claim limitations reciting the four functions that must be performed by the processing interface “in a manner transparent to any layer of the wireless networking device above the processing interface.” EX1001, 12:16-40; EX2008 (Akl), ¶65. That is because the “processing

interface” itself must contain the virtual MAC interface as claimed in limitation 1[e]—which is the same processing interface of claim limitations 1[f]-1[k] that must act in a manner transparent to the layers above. EX2008 (Ak1), ¶65. Therefore, regardless of whether Chincholi discloses transparency in some respect, it does not disclose transparency achieved by the processing interface of the ’564 patent. *See* Section V.A.1; EX2008 (Ak1), ¶65. This is what is claimed and what is required.

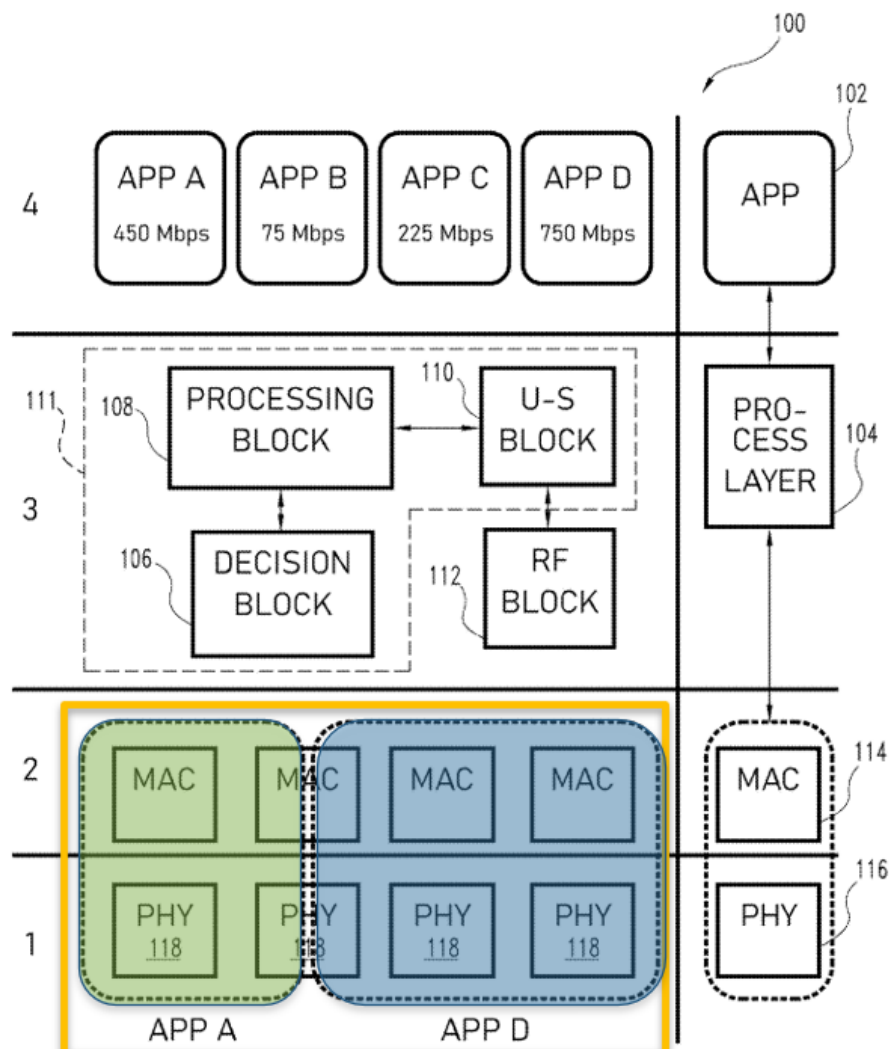
The Petition, by asserting Chincholi discloses transparency generally when what is required is transparency by a processing interface that includes a virtual MAC interface (and which indeed achieves transparency by that virtual MAC interface), fails to demonstrate that it is more likely than not that any claim is unpatentable. Because the Petition makes no attempt to show that Chincholi discloses the processing interface of the ’564 patent and its claimed transparent functions, Petitioners have failed to meet their burden, and institution should be denied.

4. Chincholi does not disclose utilization of a portions of transceiver bandwidth by one wireless networking device that “do not prevent” another wireless networking device from using remaining bandwidth.

The Petition has not established that it is more likely than not that Chincholi discloses utilization of a portions of transceiver bandwidth by a first wireless networking device that “do not prevent” another wireless networking device from

using remaining bandwidth unused by the first wireless networking device. *See* Pet. at 41-44.

Claim 1 of the '564 patent provides that a first device's utilization of the first and second identified bandwidth portions of the recited transceiver "do not prevent" any other device from using the remaining portions of the that first available bandwidth portion at the same time. EX1001, 13:5-13. This functionality is depicted in Figure 1, where App A and App D are shown sharing the use of the second MAC/PHY pair:



EX1001, Fig. 1 (annotations added). This ability to share a single transceiver’s bandwidth among two separate users denoted by the use of different applications is a key benefit of the invention. EX2008 (Ak1), ¶67.

In attempting to match this limitation, the Petition relies upon Chincholi’s disclosure of “*multi-WTRU* multi-IP flow cases,” where packets are queued and distributed in an optimized manner. Pet. at 42-43 (citing EX1005, [0328], [0352]). But a system comprising multiple WTRUs and where packets are queued and

distributed sequentially is not necessarily a system where a single transceiver's resources are shared simultaneously. EX2008 (Akl), ¶68.

Indeed, the Petition and Dr. Almeroth identify no passage in Chincholi that expressly discloses the claimed functionality, i.e., having one portion of the transmitter's available bandwidth be used for one recipient/application at the same time another portion of that transmitter is used for another recipient/application. Nor has Dr. Almeroth pointed to such functionality in any other reference that is a part of Ground 1. For this reason, the Petition must fail. *See, e.g.*, 37 C.F.R. § 42.104 ("The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon."); *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) ("The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.").

In fact, Chincholi discloses the opposite of two WTRUs being able to use different portions of a bandwidth portion (*e.g.*, a channel in the 5 GHz Wi-Fi band) at the same time; in Chincholi's architecture, only one WTRU can access a channel at a time. *See, e.g.*, EX1005, [0118]. For example, Chincholi explains that its WTRUs "may *contend with each other*" for channel access if they share an operating frequency. EX1005, [0117] (emphasis added); *see also id.* [0130] ("WTRUs 315 operating on a particular spectral band may contend with each other

for wireless medium access.”); *id.* [0119] (“delay per channel may be high due to contention among WTRUs”). Thus, Chincholi makes clear that different WTRUs communicating in the same band “contend” for channel access, meaning the winner of the contention “locks out” the others from using that channel at the same time, and, therefore, the WTRUs do not share the channel bandwidth at the same time. EX2008 (Akl), ¶68.⁷

The Petition’s only argument—and Dr. Almeroth’s only opinion addressing this topic—relates to a technique known as Orthogonal Frequency Division Multiple Access (“OFDMA”). EX1002, ¶134. Dr. Almeroth notes that Chincholi’s OMMA receives feedback information regarding the type of actual transceiver connected to its network. *Id.* One such type is identified as an OFDMA type transceiver. *Id.* The Petition’s arguments fail at least for the reason that OFMDA feedback is not data transmission using the OFDMA technique.

⁷ While Chincholi does disclose that “[a] WTRU may be able to communicate (e.g., simultaneously) with a NT over, for example, an ISM channel and a TVWS channel” (EX1005, [0117]), such capability exists only where the two WTRUs are using different bands. EX2008 (Akl), ¶69. This demonstrates that Chincholi does not teach sharing bandwidth at the transceiver—only “contending” for the transceiver, or operating on different bands and therefore not sharing. *Id.*

Instead of basing his analysis on the actual disclosure of Chincholi, Dr. Almeroth claims that OFDMA was “a known wireless communication technique for dividing an available bandwidth into smaller subcarriers (*i.e.* frequency ranges) which are then allocated to different users.” *Id.* Dr. Almeroth, however, does not cite to anything in Chincholi disclosing such operation; the cited passage refers only to feedback being given, not some form of transmission.

Moreover, Dr. Almeroth does not cite any background material demonstrating that the OFDMA technique included such functionality for wireless transceivers at the time of the invention. In fact, none of the standards cited in Chincholi—such as 802.11 a/b/g/n—implement OFDMA. EX1005, [0116]; EX2008 (Akl), ¶70. Moreover, none of the figures and related text in Chincholi discloses any details of variations from the then-existing standards to provide for implementing OFDMA in a Wi-Fi-only WTRU. EX2008 (Akl), ¶70.

The Petition thus rests upon a naked statement from an expert rather than the actual disclosure of any reference that is part of Ground 1. Consequently, it does not establish it is more likely than not any claim is unpatentable. *See, e.g., Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1004 (Fed. Cir. 2023) (“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petition must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.”); *see also In re*

Magnum Oil Tools Int’l, Ltd., 829 F.3d at 1380 (Board may not base obviousness determination on conclusory statements without explanation); *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-16 (PTAB Aug. 24, 2022) (precedential) (denying institution where petition relied on expert testimony to supply a claim limitation not found in the art).

**5. Chincholi does not disclose transmission of a data stream
“without requiring disassociation of the recipient from ...
MAC and PHY interfaces.”**

The Petition has not established that it is more likely than not that Chincholi discloses transmission of a data stream “without requiring disassociation of the recipient from ... MAC and PHY interfaces.” *See* Pet. at 36-41.

Claim 1, and therefore all challenged claims, recites that the processing interface be configured to use the first wireless transceiver to transmit the data stream “without requiring disassociation of the recipient” from either or both of the first and second actual MAC and PHY interfaces. EX1001, 12:48-13:4. Dependent claims 16 and 22 each also expressly recite this limitation. *Id.*, 14:4-32, 15:54-16:10.

To transmit data over a network, there needs to be an association between the transmitter and receiver of the data. In prior art Wi-Fi networks, when a decision was made to switch from one transmitter/receiver operating on one band to a different transmitter/receiver on a different band, or from one channel in one band to different channel on that band, the current association had to be broken before a

new association could be created. EX2008 (Akl), ¶72. This concept was known colloquially as “break before make,” and was necessary to reduce the risk of interference. *Id.* However, such breaking can cause delay and latency as a new association is created. *Id.* The invention of the ’564 patent avoids this because the virtual MAC interface provides a single, consistent MAC address for accessing the physical layer for which it is responsible. *Id.*, ¶73.

Chincholi does not deviate from the prior art norm of “break before make.” In fact, Chincholi describes a “dynamic RAT switching mode” where “the OMMA layer 1300 may select the best RAT possible... and not use the remaining RATs.” EX1005, [0154]. In such circumstance, a “RAT with the low channel quality may be *disabled*.” *Id.*, [0155] (emphasis added).

Where the description states that the OMMA layer “may select the best RAT possible ... and not use the remaining RATs,” a POSITA would understand that once a different RAT is chosen, the previous one is effectively released or disabled. EX2008 (Akl), ¶74. This is consistent with Chincholi’s use of the word “disabled.” *Id.*; *see also* EX1005, [0155]. Further, in practice, a POSITA would understand that “disabling” means the OMMA layer is disassociating from the RAT at the MAC/PHY level. *Id.* Because the OMMA drops the undesired RAT and only then associates with the new one, it employs a conventional “break before make” methodology. *Id.* Therefore, rather than disclosing transmission of a data stream

“without requiring disassociation of the recipient from ... MAC and PHY interfaces,” Chincholi discloses just the opposite.

Given this fundamental difference between Chincholi and the ’564 inventions, it is not surprising that the Petition and Dr. Almeroth fail to identify any passage from Chincholi that shows deviation from a conventional “break before make” mode. Instead, the Petition and Dr. Almeroth merely state that “Chincholi also does not ‘require’ disassociation of recipient WTRUs from either or both of the actual MAC and PHY interfaces during operation.” EX1002, ¶163; *see also id.* ¶128; Pet. at 39, 58 (citing EX1002, ¶163 and using the exact language therefrom). But this naked, citationless sentence, phrased in negative language, does not meet Petitioners’ burden and cannot stand. *Corephotonics, Ltd.*, 84 F.4th at 1004; *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d at 1380; *Xerox Corp.*, IPR2022-00624, Paper 9 at 15-16.

The Petition’s failure to acknowledge that Chincholi employs “break before make” is especially stark given that the disclosure demonstrating “break before make”—regarding the disabling of undesired RATs—is quoted by Dr. Almeroth in the context of a related patent. *See Samsung Electronics, Co. v. XiFi Networks R&D, Inc.*, IPR2025-01206, EX1002, ¶290 (quoting EX1005, [0154]-[0155]). Other sections of Chincholi also make clear that Chincholi only teaches a “break before

make” system. *See* EX1005, [0207] (OMMA tracks “availability” of WTRUs for RATs which are “enabled at different times”); EX2008 (Akl), ¶74.

Because the Petition cannot rely on Chincholi for the “without disassociating” limitation, it resorts to secondary references Clegg and Choi. Pet. at 38-41 (citing EX1002, ¶¶125-130). But, as explained below, a POSITA would have had no motivation to combine Chincholi with Clegg or Choi, especially as they do not disclose maintaining associations. *See* Section V.B. Without disclosure in Chincholi and without a motivation to combine, the Petition has failed to demonstrate it is more likely than not that the “without disassociating” limitation is disclosed. *See, e.g., KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (holding obviousness analysis demands “demonstrating that each of its elements was, independently, known in the prior art” as well as “identify[ing] a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.”)

6. The enumerated failures of Chincholi are not exhaustive.

As described above, Chincholi fails to disclose at least four limitations of every challenged claim of the ’564 patent. Therefore, the Petition fails to demonstrate it is more likely than not that any claim is unpatentable for at least these reasons. *See supra*, Sections V.A.1-5. Patent Owner reserves the right to raise

additional arguments regarding the failure of disclosure in Chincholi as to claim 1 and its dependent claims.

B. The Petition Does Not Establish that It Is More Likely Than Not that Chincholi in View of Choi and/or Clegg Renders Any Challenged Claim Unpatentable.

In addition to failing to meet its burden to demonstrate the claim limitations described above in Section V.A, the Petition also fails to demonstrate that a POSITA would have been motivated to combine Chincholi with Choi or Clegg, or that a POSITA would have had a reasonable expectation of success in so doing. In assessing the asserted combinations, it bears emphasizing that Chincholi is the only reference relied on for the limitations reciting “virtual MAC interface” (Section V.A.1.), a resource monitoring interface (Section V.A.2), a “processing interface configured to” perform claimed functions “in a manner transparent to any layer of the wireless networking devices” (Section V.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 V.A.4). Choi and Clegg, as secondary references, are not asserted to disclose these limitations. Consequently, the Petition fails based on Chincholi alone, without even reaching the asserted combinations or secondary references.

**1. The Petition Does Not Establish that a POSITA Would Have
The Petition Does Not Establish that a POSITA Would Have
Either a Reason to Combine Chincholi and Clegg or an
Expectation of Success from the Combination.**

The Petition does not establish it is more likely than not 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 13-16.

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 '564 patent's claims as a roadmap. *See Polaris Indus., Inc. v. Arctic Cat, Inc.* 882 F.3d 1056, 1069 (Fed. Cir. 2018).

First, the Petition and Dr. Almeroth claim that combining Clegg with Chincholi could be done "without technical challenge." Pet. at 15; EX1002, ¶80. 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," and specifically, via the

employment of “an ultra-wideband tuner.” EX1009 at Abstract, 9:60-10:13. Neither Chincholi nor Choi makes use of an ultra-wideband tuner; instead, they employ typical transceivers that communicate on single Wi-Fi bands under the prevailing wireless standards. *See* EX1005, [0118] (referencing 2.4GHz and 5 GHz bands); EX1016, Abstract, EX2008 (Akl), ¶81. The disclosures that the Petition and Dr. Almeroth ignore show that combining Clegg, and its ultra-wideband tuner, with Chincholi and Choi would necessitate extensive technical reworking, and consequently, a POSITA would not look to Clegg to modify Chincholi and/or Choi. EX2008 (Akl), ¶81.

Second, the Petition asserts that Clegg teaches limitations 1[j] and [k]—“us[ing] the first wireless transceiver to transmit the first data stream to the recipient, ***without requiring disassociation*** of the recipient...” from the actual MAC and PHY interfaces. Pet. at 38-41 (emphasis added). As described above in Section V.A.5, the “without disassociation” limitations provide for an improvement over the prior art method of “break before make”—where a first association must be broken before a second can be initiated. Section V.A.5; EX2008 (Akl), ¶74.

In fact, Clegg does not demonstrate the ’564 patent’s “without disassociating” limitation, and instead adheres to the prior art “break before make” norm. Again, the Petition and Dr. Almeroth do not address these disclosures in Clegg. Indeed, Clegg states that, an access point or user equipment will “take steps necessary to ... prepare

communication using the candidate carriers,” which “may involve tuning to the appropriate carriers.” *See* EX1009 at 11:4-22. A POSITA would understand that this process of tuning the carriers in order to prepare for communication would require “breaking before making.” EX2008 (Akl), ¶83.⁸ Therefore, a POSITA would not be motivated to combine Chincholi and/or Choi with Clegg in order to achieve the

⁸ Nor does the disclosure of Clegg cited in the Petition say otherwise—the “notching out” by OFDM subcarriers and “selection of a cluster of carriers” says nothing at all about breaking before making or disassociating before another association can be made. *Id.* In fact, OFDM and all standards referenced in Clegg only operate on a “break before make” basis, and Clegg does not have any disclosure of any deviations from specifically mentioned standards to implement “make before break” or OFDMA. EX2008 (Akl), ¶82. Even if the Petition is correct that Chincholi teaches the “without disassociating” limitation (it is not, *see* Section V.A.5), a POSITA would not be motivated to combine Clegg with Chincholi. EX2008 (Akl), ¶84. To the extent the Petition is wrong (it is), it would be irrelevant if a POSITA would combine Clegg with Chincholi, since neither reference, alone or in combination, discloses the “without disassociating” limitation. *Id.*

“without disassociating” limitation. *Id.*⁹ Any determination otherwise is “hindsight abuse.” *See Medtronic, Inc. v. Teleflex Innovations S.a.r.l.*, 69 F.4th 1341, 1351 (Fed. Cir. 2023) (where combination does not “achieve the same end” as the claimed invention, Board correct to find no motivation to combine, further noting that a contrary finding would be “a recipe ripe for hindsight abuse”).

⁹ The Petition appears to argue that the combination would need to be further modified according to the teachings of U.S. Patent 9,379,868 to Wang regarding “association identifiers,” in order to achieve the “without disassociation” limitation. Pet. at 40. Neither the Petition nor the supporting expert declaration provide any details as to how these modifications would be done to three systems, all of which use a “break before make” modality. Moreover, the Petition relies upon Wang as much more than a background reference; but Wang is not identified as part of the Grounds and so should not be considered in evaluating the asserted combination. *See Meta Platforms, Inc.*, IPR2023-01023, Paper 10, at 31 (PTAB January 9, 2024) (“We further note that several of Petitioner’s assertions are supported only by VR Book, which is not relied upon as the basis for this challenge . . .”).

2. The Petition Does Not Establish that a POSITA Would Have Either a Reason to Combine Chincholi/Clegg and Choi or an Expectation of Success from the Combination.

Recognizing that even their hypothetical combination of Chincholi and Clegg does not cover the subject matter of the claims of the '564 patent, Petitioners introduce a third reference into the mix: Choi. The subject matter of Choi is disclosed in the context of 802.11 standards/specifications. EX1016, 1:21-26, 1:49-55; 8:43-54. Petitioners' expert relies upon the fact that both Choi and Chincholi fall under the umbrella of 802.11 standards as supplying a motivation to combine the two references. EX1002, ¶81.

As reflected above, however, the 802.11 standards employed the traditional "break before make" methodology of switching from one transceiver to another. EX2008 (Akl), ¶86. Nothing in Choi's disclosure or proposed modification to 802.11 networks suggests changes to this protocol. To the contrary, Choi's disclosure indicates it is using a conventional "break before make" modality and would not satisfy the "without disassociation" element of the claims. EX1016, 8:43-48. Consequently, a POSITA would have no motivation to combine Chincholi/Clegg with Choi in order to achieve the "without disassociation" limitation. EX2008 (Akl), ¶87.

Similarly, as also reflected above, conventional networks of this era employing 802.11 standards did not accommodate having a transceiver's resources

shared by multiple users/applications at the same time. *Id.*, ¶87. Nothing in Choi’s disclosure or proposed modification to 802.11 networks suggests a change to this convention. To the contrary, Choi makes several references to “OFDM” technique, which stands for Orthogonal Frequency Division Multiplexing.” EX1016, 6:30-34, 8:44-45; EX2008 (Akl), ¶86. OFDM is a *single-user* technique, not to be confused with OFDMA. EX2008 (Akl), ¶86. Accordingly, systems using Choi’s disclosure would not satisfy the “does not prevent” element of the claims, and a POSITA would not be motivated to combine Choi with Chincholi/Clegg to achieve sharing transceiver resources. *Id.*

As discussed above, Chincholi does not disclose either the “without disassociation” or “do not prevent” elements of the claims. That alone defeats the Petition and renders any consideration of Choi moot. To the extent that the Board concludes differently with regard to Chincholi, the Petition should still fail as to all claims because the hypothetical inclusion of Choi into the combination has not been shown to be workable. At this point in time, a system employing a conventional “break before make” modality could not be combined with one that maintains associations without significant modifications that undercut a reasonable expectation of success. *Id.*, ¶88. Petitioners’ expert relegates this important issue to a single conclusory sentence. EX1002, ¶82 (a “POSITA would have recognized that Choi’s techniques could be implemented into Chincholi without technical challenge

and with a reasonable expectation of success.”). The words of an expert, especially when untied to facts, are insufficient to support an obviousness finding. *See Corephotonics, Ltd.*, 84 F.4th at 1004; *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d at 1380. Without a showing that any claim is more likely than not unpatentable, institution should be denied.

VI. THE PETITION DOES NOT ESTABLISH THAT THE CLAIMS OF THE ’564 PATENT ARE INVALID UNDER SECTION 101 OR 112.

The Petition next argues that the ’564 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 it is more likely than not that any claim is unpatentable. As with Ground 1, institution should be denied as to Grounds 2, 3, and 4.

A. The Petition Fails to Demonstrate that the ’564 Patent Is Directed to Ineligible Subject Matter.

The Petition asserts that the ’564 patent does not claim patentable subject matter pursuant to 35 U.S.C. §101. Pet at 73-83. 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 make the requisite showing under step one of that

framework that the challenged claims are directed to an abstract idea. While that failure renders consideration of step two unnecessary, the Petition also fails to establish that the '564 patent's claims contain no inventive concept, largely because it ignores fundamental aspects recited in the challenged claims. As with Ground 1, the Petition has not shown that it is more likely than not the '564 patent is invalid under Ground 2.

1. The Claims Recite a Specific Improvement to a Conventional Wireless Networking System.

The Petition's argument that the claims of the '564 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. For example, courts must "consider the claim as a whole," which includes "read[ing] it in light of the specification." *Packet Intel. LLC v. NetScout Sys., Inc.*, 965 F.3d 1299, 1309 (Fed. Cir. 2020) (citations omitted). The Federal Circuit has provided guidance for applying step one to software inventions, such as what is largely claimed in the '564 patent: 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, 1336 (Fed. Cir. 2016); *see also Uniloc USA,*

Inc. v. LG Elecs. USA, Inc., 957 F.3d 1303, 1306 (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).

Equally important, courts must avoid “describing the claims at such a high level of abstraction and untethered from the language of the claims” to ensure that the exceptions to Section 101 do not swallow the broad rule of patentability. *Enfish*, 822 F.3d at 1337. 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). Abstractions that ignore or marginalize claim limitations and overgeneralize or simplify the claims are “untethered” from the patent and do 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).

The Petition’s Section 101 argument contravenes this law, because it overgeneralizes the claims, reducing them to functional results, rather than discussing the recited elements that provide the technical improvements delivering those results and capabilities.

a. The eligibility of the claims must be assessed in the context of the architecture of conventional wireless networks.

The specification clearly states that it “relates to wireless networks, and more specifically to high bandwidth wireless networks for distributing multimedia

content.” EX1001, 1:40-42. Neither the Petition nor Dr. Almeroth offers much explanation or tutorial regarding the architectural principles at the foundation of wireless networks, and therefore omit important context of what a POSITA would understand when in possession of the ’564 patent and its claims. An appreciation of such principles provides context for the understanding that a POSITA would have of the ’564 patent generally and why its claims recite patent eligible subject matter.

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. EX2008 (Akl), ¶90 (quoting EX2010 (Tanenbaum) at 41-42). At the top of this stack is what is typically referred to as the Application Layer; it contains protocols commonly needed by users, such as email, streaming content, and accessing the web. *Id.*, ¶91. At the bottom of the stack is the physical layer, focused on the mechanics of generating/transmitting raw bits of data over a communications channel. *Id.*, ¶92. The layer immediately on top of the physical layer is known as the data link layer; it is responsible for transforming the raw data into frames that can be organized in a manner recognizable and free of error. *Id.* The layer on top of the data link layer is typically referred to as the network layer; it is responsible for

routing decisions across the network, working to avoid bottlenecks and congestion.¹⁰

Id.

The data link layer is conventionally viewed as including two distinct sublayers. The upper layer, closest to the network layer, is typically referred to as the Logic Link Control (“LLC”) sublayer. The lower layer, closest to the physical layer, is known as the medium access control (“MAC”) sublayer.

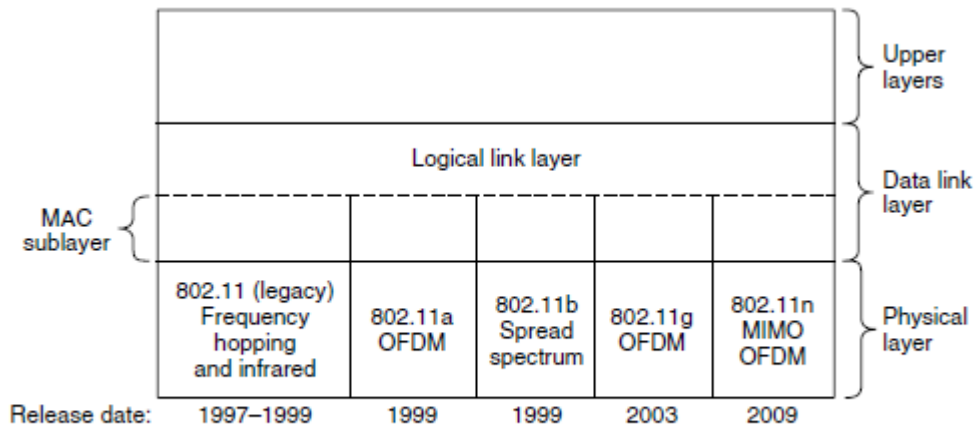


Figure 4-24. Part of the 802.11 protocol stack.

EX2010 at 300; EX2008 (Akl), ¶93.

The LLC sublayer acts as an interface between the network layer and the MAC sublayer. Its main functions are to provide multiplexing for multiple network protocols to implement flow control and handle error management. The MAC

¹⁰ There are typically other layers between the networking layer and the applications layer not pertinent to the issues presented here.

sublayer facilitates access to a shared communications channel. EX2008 (Ak1), ¶94. It controls access to the network, prevents data collisions, and ensures reliable transmission. *Id.* Key functions include defining packet formats, handling physical addressing (MAC addresses), and providing error detection. *Id.* The MAC sublayer has what is known as a service access point (“MAC SAP”). *Id.* This is the point through which the upper layers of network accesses the MAC sublayer and thus the underlying physical media. *Id.*

In such network stacks, one layer can only communicate directly with the layer immediately above or below it. *Id.*, ¶95. In the prior art, this limited the speed and efficiency/granularity of resource allocation decisions made by conventional wireless networks (such as those disclosed in the cited art and those disclosed in the Chincholi reference) because those systems made such decisions *at the network layer*. *Id.*, ¶¶95-96. In making these decisions, interfaces in the network layer could not consult with the physical layer regarding current resource availability and characteristics. *Id.*, ¶96. The claims address this constraint by introducing a virtual MAC interface and a resource monitoring interface into the upper part of the MAC sublayer. *Id.* Because these components are placed in that layer, they can communicate with both the physical layer the actual MAC interfaces located below the virtual MAC interface in the MAC sublayer, and the upper portions of the data link layer. *Id.*

Patent Owner emphasized this tangible improvement in prosecuting a related patent¹¹:

It is respectfully submitted that the claims presented herein are patentable for at least the same reasons that the previously pending claims are patentable stated in the last preliminary amendment and related cases. These reasons include, for example, the inclusion of a processing interface having at least one virtual MAC interface and a virtual PHY interface for each band providing feedback to the at least one virtual MAC during operation about bandwidth availabilities for each band, as well as a requirement that all bandwidth allocation decisions be made in a manner *transparent to the layers above the MAC/PHY interfaces*.

EX2014 at 10-11 (emphasis added). Notably, Patent Owner cited this placement as what enables transparent decisions (as that term is discussed *supra*, at Section V.A.3 and *infra*, at Section VI.B.1). As explained further below, this context supports the

¹¹ That patent, U.S. Patent No. 11,950,105, is a parent of the '564 patent, shares a specification with the '564 patent, and also claims priority to the '216 and '219 provisionals.

conclusion that the claims of the '564 patent recite detailed technology that improves computing, not an abstract idea.

b. Inserting a virtual MAC interface and resource monitoring interface into the MAC sublayer of Layer 2 is a concrete improvement to a conventional wireless networking system.

As reflected in its title, and discussed herein with regard to the Chincholi reference, an improvement of the '564 patent, and what allows for the functions claimed throughout, is the novel use of a virtual MAC interface, positioned as disclosed and claimed to achieve transparency in its operations. *See supra*, Section V.A.1. When the Petition attempts to “boil down” the claims, it conveniently “boils away” the limitations that it is the virtual MAC interface of the processing interface that performs these supposedly “simple requirements” and that it does so in a transparent fashion. The fact that the Petition has to boil away important claim language in order to make its generic abstraction argument signals the weakness of that argument. *See Enfish*, 822 F.3d at 1337-1338; *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”).

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 prosecution history explain result from using those claimed features. As the specification states:

Conventional wireless networking architectures fail to provide adequate resources to efficiently provide optimum range and coverage for wireless network users, and fail to take full advantage of the resources available to satisfy the desire for more bandwidth.

EX1001, 1:56-60. The specification does not merely claim the end result of better resource allocation, but rather identifies the use of the recited virtual MAC and PHY layers as what facilitates that result:

[T]he virtual MAC and PHY layers enable simultaneous allocation of multiple PHY resources for different signal types associated with different applications. As a result, the wireless networking system 100 exhibits significant performance improvements and efficiency advantages.

EX1001, 3:52-57. An example of such improvement is shown in Figure 1, where the resources of a particular transceiver can be shared by different applications at the same time, so no resources are wasted and latency is reduced. As explained in the specification, this type of granular allocation of bandwidth can be achieved by

defining the virtual MAC layer and resource monitoring interface with appropriate resources. EX1001, 4:30-40.

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.¹² 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. EX2008 (Akl), ¶99.

¹² The specification contains numerous references to the components of the physical layer communicating directly with either/both the virtual MAC interface and/or the resource monitoring interface. *E.g.*, EX1001, Fig. 1, (process layer 104 communicates with MAC 114 and PHY 116 as noted in bidirectional line); Fig. 4 (virtual MAC management layer 302 can communicate with PHY of device 1 and device 2, as noted by bidirectional line); Fig. 5B & 5:38-41 (programmable register 508 provides a way to specify the storage capacities of each of the buffers, thus enabling control of the respective transmit and receive time); EX2008, ¶98. These direct communications are possible because the processing interface is in the layer above the physical layer, the MAC sublayer. *Id.*

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 73-80. Rather, under precedent such as *Enfish*, this is exactly the type of subject matter that is patent eligible. *Enfish*, 822 F.3d at 1339 (reversing district court’s finding of ineligibility because claims directed to a “specific type” of structure “designed to improve” a computer function are not abstract; reversing district court’s finding of ineligibility because claims were directed to a specific structure that functioned differently from conventional structure); *see also Contour IP Holding LLC*, 113 F.4th at 1379-1380 (Fed. Cir. 2024) (reversing district court’s ineligibility determination because “characteriz[ing] ... claims at an impermissibly high level of generality” “disregard[ed] the disclosed technological means for obtaining a technological result”); *Packet Intel.*, 965 F.3d at 1308-1310 (affirming reasoning that claims were not abstract where they were directed to “solving a discrete technical problem” and “specific technological solutions”); *Uniloc*, 957 F.3d at 1306-1308 (Fed. Cir. 2020) (reversing district court’s ineligibility holding where claims recited a specific component solving problem in conventional systems and “changes the normal operation of the communication system itself to overcome a problem specifically arising in the realm of computer networks”); *Mentone Soln’s LLC v. Digi Int’l Inc.*, Nos. 2021-1202 & 2021-1203, 2021 WL 5291802, at *6 (Fed.

Cir. Nov. 15, 2021) (reversing district court ineligibility determination and holding claim at issue was a patent eligible improvement to computer functionality, achieved through the addition of a novel component that alters the normal function of the system); *SRI Int'l*, 930 F.3d at 1303-1304 (holding that claims directed to “using a specific technique” “to solve a technological problem arising in computer networks” were not abstract, and affirming that claims that “prevent the normal, expected operation of a conventional computer network” were not abstract).

Two cases cited by the Petition merit closer discussion because Petitioners submit that the facts in those cases closely align with the current situation. However, they 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). Essentially, the court stated that “claim 1 manipulates data but fails to do so in a non-abstract way.” *Id.* at 1338. 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.

Because the claims turn on the virtual MAC interface and the novel manner in which it allows for transparent functioning of the claimed invention, the '564 patent is unlike the invention in *Two-Way Media* and more like the invention in *Mentone*, where the Federal Circuit held the claims at issue to be patentable. *Mentone Sols.*, 2021 WL 5291802, at *1-6. There, the claims were directed to dynamic resource allocation in radio communications. *Id.* at *1. The Federal Circuit held the claim at issue to be a patent eligible improvement to computer functionality because the invention achieves its improvement through the addition of a novel component that alters the normal function of the system (“permitting additional multislot configurations for certain classes of mobile stations using extended bandwidth allocation”). *Id.* at *3. Further, both the claims and specification recited the method for achieving this improvement. *Id.* at *4. The court distinguished *Two-Way Media* and its “recited ... series of abstract steps” because the claims at issue in *Mentone* provided detail on the steps of a technological solution. *Id.* at *5. In the end, the court reversed the district court because it overgeneralized the claimed invention and failed to mention the novel component in the claims. *Id.* at *6. This is the error of the Petition: it fails to mention the virtual MAC interface and its placement in the layer stack in order to achieve transparency.

Second, *Rady v. Boston Consulting Group* involved the use of conventional components to gather and store data. “Claim 1 requires identifying a physical item’s

unique pattern of physical imperfections, or ‘signature,’ and then recording that information to a blockchain if the object has not been previously registered.” 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. *Id.* at *4. The Federal Circuit found the claims abstract because they did “not purport to solve any technological problem,” used “existing imaging and blockchain technology in predictable ways,” and “rel[ied] on existing technological tools to gather and record data but disclose[d] no purported improvement in the tools themselves.” *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 ‘564 patent’s, which recite “a specific technique ... to solve a technological problem arising in computer networks” are not abstract—especially as they involve a novel component that diverges from conventional usage. *SRI Int’l, Inc.*, 930 F.3d at 1303; *see also Uniloc USA, Inc.*, 957 F.3d at 1306-1308. In keeping with this well-developed precedent, institution on 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 and is in no way abstract. 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 largely repeats its prior arguments in attempting to marshal a record that the claims of the '564 patent contain no inventive concept. Pet. at 80-82. The Petition repeatedly cites the mantras of “routine” “conventional” and “well-known,” concluding that the claims “merely require conventional networking components that were well known to POSITAs.” Pet. at 80. The arguments above as to why the claims recite an improved networking system, not just a functional result, apply equally here. *See supra*, Section VI.A.1. However, taking the Petition at face value—only for the sake of the argument—it notably never mentions the placement/location of those components. Notably missing from the Petition and its 200-plus paragraph expert declaration is *any* discussion of conventional networking stacks and the layers in those stacks. *See generally* Pet.; EX1002. To repeat, conventional networking systems of the type the Petition points to, including

Chincholi, made bandwidth allocation decisions at higher levels, limiting their ability to make decisions at a granular level and without latency. EX2008 (Akl), ¶99.; *see* EX1004 at 370-371 (referencing that the processing interface operates “below the logical link layer” and that any routing decisions and link selection disclosed in the prior art is done “at a layer well above the MAC/PHY interface and thus are not transparent to those interfaces”). It is telling that the Petition completely avoids this fundamental concept of the ’564 patent’s claims.

The Petition’s failure to appreciate the location/placement of the processing interface highlights why its secondary argument also fails. The Petition criticizes the ’564 patent for not explaining how transparency is achieved, and how the system ensures that use of one part of a transceiver’s resources does not prevent use of the remaining portion. Pet. at 81. With the benefit of the disclosure of the ’564 patent, a POSITA would understand that making bandwidth allocation decisions in the MAC sublayer of Layer 2 makes those operations transparent to the layers above. EX2008 (Akl), ¶97. The Petition erroneously treats the transparency limitation as something that requires particular additional instrumentalities to achieve, but it does not. Pet. at 81; EX2008 (Akl), ¶97. Instead, the claimed transparency is achieved by virtue of the inventive location of the processing interface. EX2008 (Akl), ¶97. Similarly, by being able to communicate with the physical layer, the processing interface can access the full range of channels available, as shown in Figure 1. *Id.*, ¶96.

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 (Fed. Cir. 2017) (affirming that a system that could be "distinguished ... from 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. Institution should be denied.

B. The Petition Fails to Demonstrate that the '564 Patent's Claims Lack Adequate Written Description.

The Petition complains that a variety of limitations of the claims of the '564 patent lack adequate written description (Ground 3). Pet. at 83-97. "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). "[T]he disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question.'" *Quake v. Lo*, 928 F.3d 1365, 1374 (Fed. Cir. 2019) (quoting *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570 (Fed. Cir. 1996)). That is, the specification must "set forth enough detail to allow a person of

ordinary skill in the art to understand what is claimed and to recognize that the inventor invented what is claimed.” *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 928 (Fed. Cir. 2004). 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*, 928 F.3d at 1374 (quoting *In re Ruschig*, 379 F.2d 990, 994-95 (C.C.P.A. 1967)) (citation modified).

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. The Petition ignores the understanding of one of skill in the art and protests that known terms and concepts are unsupported, when they would be simply understood by a POSITA. At other times, the Petition ignores explanatory disclosures in the written description. In all cases, the Petition fails to demonstrate it is more likely than not that any claim of the ’564 patent is unpatentable. Institution should be denied.¹³

¹³ The Petition does not cite to the ’216 or ’219 provisional applications and does not reserve any right to do so. Indeed, the Petition does not challenge in this proceeding that the ’564 patent’s priority date is the date of those provisional

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 86-87. 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*, 93 F.3d at 1570 (noting that “*ipsis verbis* disclosure is not necessary to satisfy the written description requirement”); *see also Purdue Pharma LP v. Faulding Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000) (holding that the disclosure does not have to provide *in haec verba* support in order to satisfy the written description requirement). Rather, what is required is the understanding of a POSITA that the claim term is disclosed. *See, e.g., University of Rochester*, 358 F.3d at 928. In this case, a POSITA would understand the claimed invention of the ’564 patent to include functionality “in a manner transparent to any layer ... above the processing layer.” A POSITA at the time of the ’564 patent’s priority date would understand that “transparent” operations would be those that “obscur[e] the

applications. Pet. at 5 & n.1. Accordingly, Patent Owner will respond to the arguments and the record presented in and with the Petition.

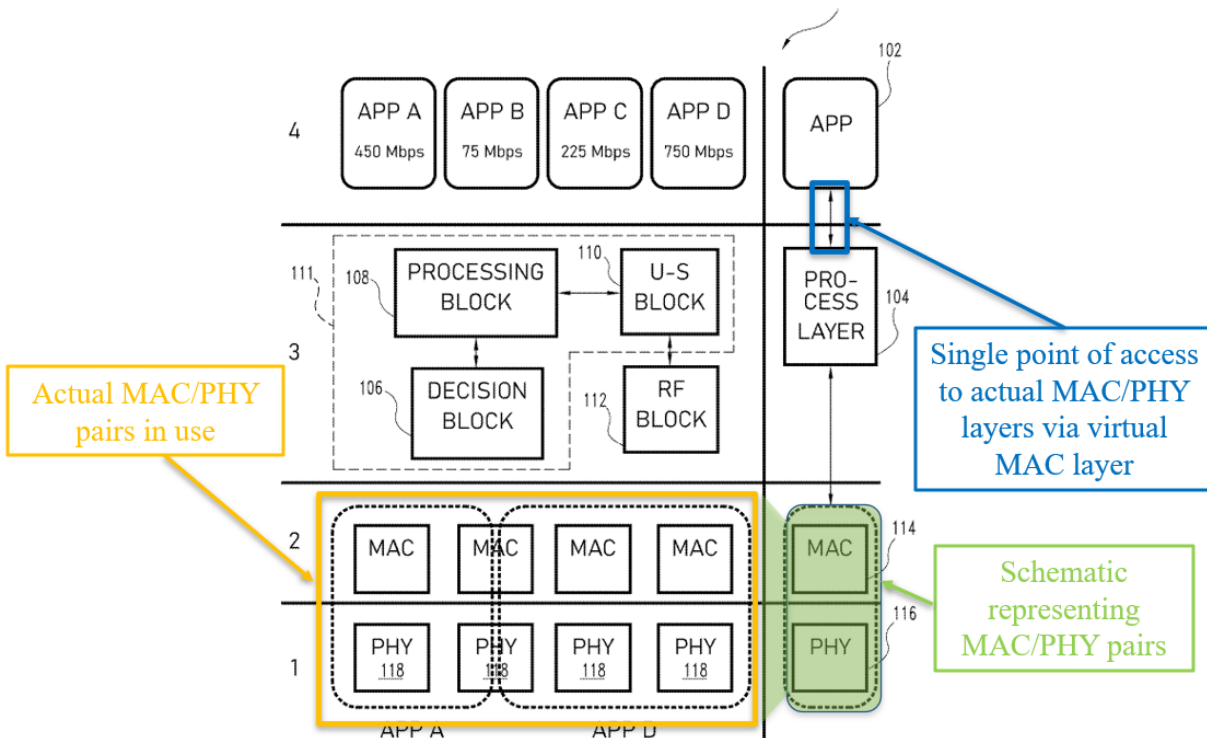
addresses and operation of the actual MAC and PHY layers to the upper layers.”

EX2008 (Akl), ¶64; *see also* Section V.A.3, *supra*.

This is consistent with representations Patent Owner made to the office in the August 8, 2023 amendment explanations cited in the Petition, where Patent Owner explained that the ’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 decisions.” EX1017 at 557 (8/8/2023 amendments remarks).¹⁴ Thus, the Petition is also incorrect that the August 8, 2023 submission to the office failed to discuss transparency (Pet. at 87)—in fact, it confirmed that the ’216 provisional did demonstrate transparency. EX2008 (Akl), ¶102.

¹⁴ To the extent that Patent Owner cites to remarks contained in a file history of the ’564 patent or a related patent throughout this preliminary response, Patent Owner does not rely on the remarks to the Office as part of the written description, but rather cites them to demonstrate that these arguments, consistent with the reasoning here, have been made to the Office before, and prior to ultimate allowance of the various patents.

Further, as shown above, a POSITA would recognize that the single point of access between the upper layers and the actual MAC/PHY pairs below would represent transparent operations:



EX1001, Fig. 1 (annotations added)¹⁵; EX2008 (Akl), ¶¶64-65, ¶103. The double-headed arrow highlighted in blue above would convey to a POSITA that, by transmitting information from the MAC/PHY pairs in the lower layers through a

¹⁵ The August 8, 2023 submission to the Office makes clear that the '216 provisional included Figure 1, including the highlighted structures. EX1017 at 556-563 (describing Figure 1 in detail).

single MAC service access point (rather than, for example, having direct communication between the network layer and only the MAC layer in each one of the MAC/PHY pairs), layers above the single MAC SAP would be indifferent to the manner of implementation by the processing layer or below, while all decision making is performed below the MAC SAP. EX2008 (Akl), ¶103. Thus, the disclosure of the '216 provisional, via Figure 1, would give a POSITA the understanding that the invention of the '564 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. Pet. at 87-89. Specifically, the Petition asserts that though “the '564 specification makes some passing references to data transfer cycles (EX1001 at 3:7-12), data transfer rates (*id.* 3:21-23, 8:10-11), data transfer capability (*id.* 3:66, 8:55-56), data transfer efficiency (5:50-51), and data transfer optimization by controlling transmit and receive times (*id.* 6:9-11), it never discusses any evaluation of data transfer *characteristics*.” *Id.* at 88-89 (emphasis in original). Again, the Petition seems to expect “*ipsis verbis* disclosure”—which is not required. *See Fujikawa*, 93 F.3d at 1570; *see also Purdue Pharma LP*, 230 F.3d at 1323 (no *in haec verba* requirement).

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* EX2008 (Ak1), ¶105 (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 '564 patent's disclosure. *Id.*

Further, contrary to the assertions in the Petition, the '564 patent's specification in fact does discuss the evaluation of data transfer characteristics. Some examples include discussion of determination of "insufficient bandwidth" (such that the bandwidth was evaluated). EX1001, 5:1-8; EX2008 (Ak1), ¶106; *see also* EX1017 at 557-558 (describing evaluation of bandwidth in '216 provisional). The specification further discusses "continuous updating based on environmental conditions," where a POSITA would consider "environmental conditions" in the area where the wireless networking device is used like interference from other sources and physical obstructions that have effects on such data transfer characteristics as delay/latency, jitter, packet loss, bandwidth, reliability, and throughput. EX1001, 5:8-11; EX2008 (Ak1), ¶106.

References to "enabl[ing] efficient wireless access ... by users that might be outside the range of a single wireless access point" would also indicate to a POSITA that the invention of the '564 patent includes evaluation of data transfer

characteristics, such as received signal strength. EX1001, 10:49-52; EX2008 (Akl), ¶106; *see also* EX1001 at 6:65-7:46, 9:10-35, Figs. 7 & 11 (also demonstrating evaluation of signal strength).

In all, the Petition resorts to simple word searching, rather than viewing the specification from the point of view of a POSITA. Once examined from the perspective of a POSITA, it is clear that the '564 patent's disclosure adequately supports the "evaluating data transfer characteristics" claim term.¹⁶

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

The Petition's written description challenge to the term "resource monitoring interface" rests upon a misunderstanding of the law, an incomplete reading of the specification and claims, and a misinterpretation of the prosecution history of the '564 patent. Pet. at 89-90. A proper reading of the intrinsic record demonstrates that there simply is no basis for the Petition's challenge to this claim term and that the inventor possessed the subject matter for the claim at the time of the application.

Before examining the specification to determine what is disclosed about the resource monitoring interface, it bears emphasizing that the Petition is not claiming

¹⁶ As described below in Section VI.C.2, a POSITA would also have understood what "better" data transfer characteristics would mean.

that this term is unknown in the art or otherwise indefinite. To the contrary, Petitioners' expert states unequivocally that the term is recognized as a "broader element" than virtual PHY layers. EX1002, ¶217. And, in the prior art section of that opinion, the expert opined that "[a] POSITA would understand that '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." *Id.*, ¶105. Although Patent Owner disagrees with fundamental aspects of this definition (*see* Section V.A.2, *supra*), the fact that the Petition offers it confirms that this term is known to those of ordinary skill in the art.

These concessions highlight why the Petition's legal premise for this written description argument is suspect. The Petition begins its discussion of this topic by presuming that there must be a written description problem simply because the specification does not use the specific term "resource monitoring interface." Pet. at 89 ("The '564 specification nowhere describes a resource monitoring interface."). Not finding this exact term in the specification, the Petition concludes there must be a written description issue. *Id.* at 89-90. This attempted framing invites legal error because the law is clear that *in haec verba* correspondence between the claims and the specification is not required by Section 112. *See Purdue Pharma LP*, 230 F.3d at 1323 (holding that the disclosure does not have to provide *in haec verba* support in order to satisfy the written description requirement); *Fujikawa*, 93 F.3d at 1570

(similar). The Petition is not entitled to a legal “short-cut”; it cannot avoid a detailed analysis of the substance of the disclosure merely because the challenged term does not appear there, especially given the Petition’s concession that a POSITA would understand that term independently.

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. As the Petition acknowledges, the specification discloses that an RF block forms a virtual layer that communicates with the ultra-streaming block about actual resource availability. Pet. at 89. Specifically, the disclosure identifies several alternative embodiments that perform this operation, some of which include components in addition to the RF block:

For one embodiment, the RF block(s) communicate directly with the ultra-streaming block about actual resource availability, and the ultra-streaming block sends information back to the decision block in the virtual MAC layer.

EX1001, 4:54-58.

The specification contemplates an alternative embodiment for this functionality: “Alternatively, the virtual PHY RF block may directly communicate with the virtual MAC decision block and/or the processing block.” EX1001, 4:58-

60. Additionally, as referenced above, in some embodiments, the ultra-streaming block works with the RF block in carrying out this monitoring operation: “While not explicitly shown in FIG. 1, the ultra-streaming block carries out a monitoring function, more fully described below, that feeds back wireless resource availability to the decision block 106.” EX1001, 3:41-45; *accord id*, 8:29-32. Accordingly, the specification discloses alternate components/pathways for gathering information about bandwidth availability and feeding it to the decision block of the virtual MAC; in all of these embodiments, the primary component for doing so is the RF block, though in some embodiments, additional components like the ultra-streaming block are included. EX2008 (Akl), ¶109.

At the same time, the specification also describes that the RF block and virtual PHY interface (originally recited) perform a number of other tasks unrelated to feeding information about resource availability back to the virtual MAC interface. This includes controlling transmit/receive times (“cycle times”) and/or configuring transmit and receive buffer sizes. *E.g.*, EX. 1001, 5:56-60, Figs. 5A, 5B & 6. Again, these operations have nothing to do with feeding information regarding bandwidth availability back to the virtual MAC interface, even though in some embodiments those functions are also performed by the RF block. As essentially software/firmware constructs, 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), ¶110.

Given these disclosures, the Petition misreads the amendment as an attempt to broaden the claim to include completely new matter. Pet. at 89. To the contrary, 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. This includes all the embodiments disclosed as being engaged in this operation, including (but not limited to) the cooperation between the RF block and the ultra-streaming block. As was explained during prosecution of a related patent with reasoning that would apply equally here, U.S. Patent No. 12,169,756, in describing the resource monitoring interface:

Figure 3 shows a virtual physical layer 304 that is connected to four actual MAC/PHY pairs each of which is associated with a wireless transceiver. The virtual physical layer 304 is shown in schematic form indicating that it contains an RF block for each one of the four actual MAC/PHY pairs shown in Figure 3. There the two arrows shown in Figure 3 illustrating communication from the virtual physical layer 304 to the virtual MAC layer 302 which indicates that each RF block provides the virtual MAC layer 302 with information

regarding the bandwidth availabilities of the wireless transceivers
associated with the four actual MAC/PHY pairs.

EX2015 at 8. This description is echoed by the Patent Owner's citation, during prosecution, to Figure 1 and the interactions between the RF block and components of the virtual MAC interface noted in paragraphs 21-24 of the original application, as support for the amendment. *See* Pet. at 90.

Whether this amounts to a broadening of the claim need not be determined here; such characterization by itself is irrelevant to whether the inventor possessed the subject matter at the time of the original application. Where, as here, the inventor described different embodiments of components involved in providing information regarding bandwidth availabilities to the virtual MAC interface, and claimed those embodiments using a term directly linked to accomplishing that task there simply is no question that the inventor possessed the claimed subject matter.

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. EX2008 (Akl), ¶109. The specification satisfies Section 112 regarding the claim term "resource monitoring interface."

4. The claim term “adapted to emit radio waves to 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 90-91 (“Indeed, nowhere in the specification does it even use the word ‘band’....”). 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 ’564 patent from the perspective of a POSITA. The ’564 patent’s specification and the provisional application to which it claims priority explicitly mention Wi-Fi standards and multiple Wi-Fi radios. *See* EX1001, 3:15-18 (“Referring to FIG. 1, one embodiment of a wireless networking system, generally designated 100, is shown in an abstract ‘layer’ context. Generally speaking, the system may involve a WiFi network....”); 3:64-67 (referencing “multiple radios”); 4:1-4 (“The actual PHY layer transceivers may transmit and receive data consistent with ... the IEEE 802.11 Standard”); EX1017 at 556 (“On page two of the 10/30/2013 ’216 provisional, ‘Wi-Fi radios’ and ‘multiple radios’ are referenced....”), 559 (“Page 2 of the 10/20/2013 ’216 provisional discloses ‘Wi-Fi radios’ and page 3 mentions ‘IEEE 802.11.’”).

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. EX2008 (Akl), ¶¶112. A POSITA would further understand that the “multiple radios” of the ’564 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.*, ¶¶112-113. 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. A single radio is associated with each individual actual PHY layer. Each radio has bandwidth availability up to an actual bandwidth. Wi-Fi radios emit radio waves in different bands of frequencies such as, for example, 2.4 GHz, 5 GHz and 6 GHz.”).

By repeated references to the Wi-Fi standard and multiple radios, a POSITA would have understood that the invention of the ’564 patent included transceivers adapted to emit radio waves in different frequency bands. There is no lack of written description support.

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 91-93. The Petition correctly recognizes that the ’216 provisional includes a portion explaining that “the RF block in the virtual PHY layer communicates directly with the Ultra-Streaming Block about actual resource availability and the Ultra-Streaming Block sends the information back to the Decision Block in the virtual MAC layer,” as well as “Figure 1 of that application [that] shows four actual PHY layers each of which contains a radio.” EX1017 at 557-558; EX1001 at Fig. 1; Pet. at 92.

This substance is more than adequate to indicate to a POSITA that the actual MAC and PHY interfaces create associations with the recipient. First, a POSITA would understand that, in a Wi-Fi system like that of the ’564 patent, “association” merely indicates that the two components are in radio range of each other and connect with each other. *See* EX2008 (Akl), ¶116; *see also* EX2010 (Tanenbaum) at 311. A POSITA would understand that a user or a device has an association with the actual MAC and PHY layers. EX2008 (Akl), ¶116; *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 ’564 patent’s wireless system. EX2008 (Akl), ¶116; *see also, e.g.*, EX2010 (Tanenbaum) at 390, 463 (textbook using “recipient” to refer to entity receiving data transmission in multiple contexts).

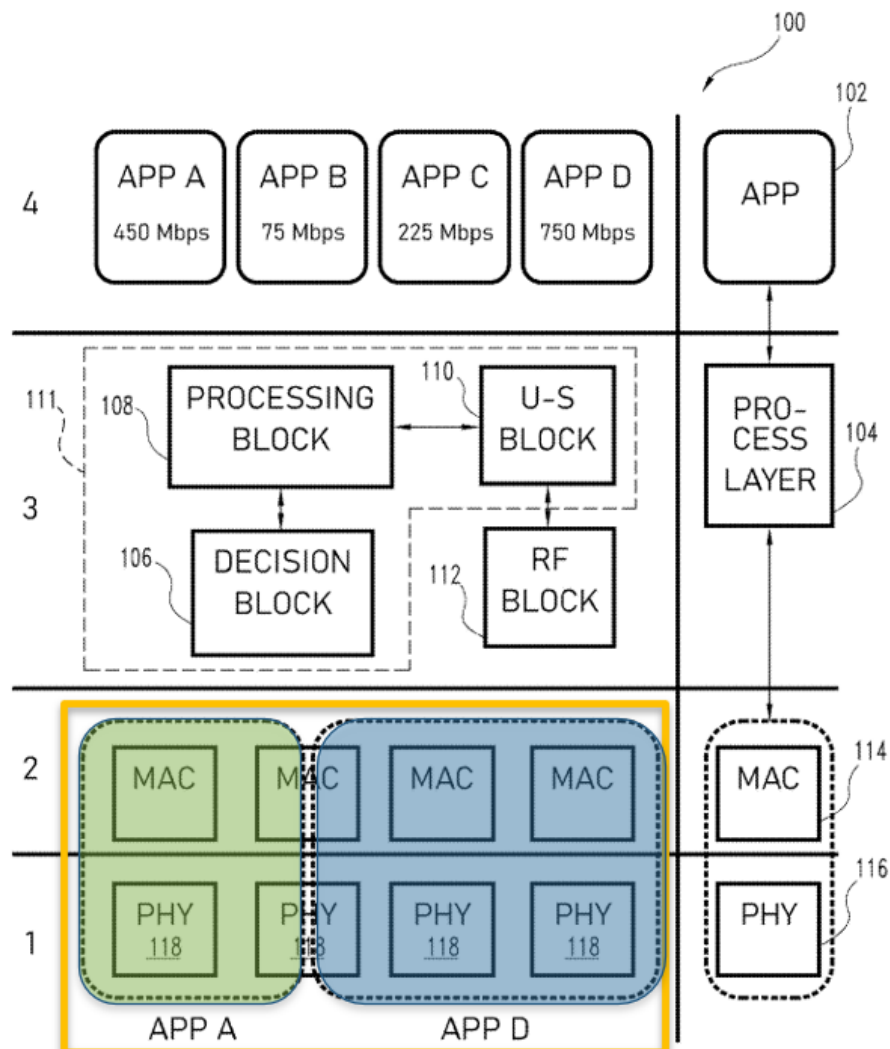
Yet again, the Petition ignores the perspective of one of skill in the art to create purported inadequacies in written description support where there are none. Here, there is adequate written description supporting claim limitations reciting “creating associations” between actual MAC and PHY interfaces and “the recipient.”

6. The claim term “without requiring disassociation” is supported by adequate written description.

Building on its error regarding “creating associations,” the Petition asserts that the ’564 patent claims lack adequate written description for the “without requiring disassociation” limitations “[b]ecause the ’564 specification does not even mention the concept.” Pet. at 93-94.¹⁷ Again, this is founded on ignoring what a POSITA would understand the specification to convey.

¹⁷ The Petition’s assertion that “without requiring disassociation” is a negative limitation is inapposite. Pet. at 94. A negative limitation is that which excludes something, such as reciting “an alkenyl radical *other than* 2-butenyl and 2,4-pentadienyl” or “said homopolymer *being free from* the proteins, soaps, resins, and sugars present in natural Hevea rubber.” See MPEP § 2173.05(i) (emphasis added). However, rather than describing an exclusion or an absence, a POSITA would understand the “without requiring disassociation” limitation, in light of the entire claim, to be one of two alternative choices for system configuration: “make before

Both the '564 patent's specification and the '216 provisional include Figure 1, with four radios used by App A and App D. EX1001, Fig. 1; EX1017 at 557-558. Each App A and App D are using multiple radios, including one that they share. *Id.*



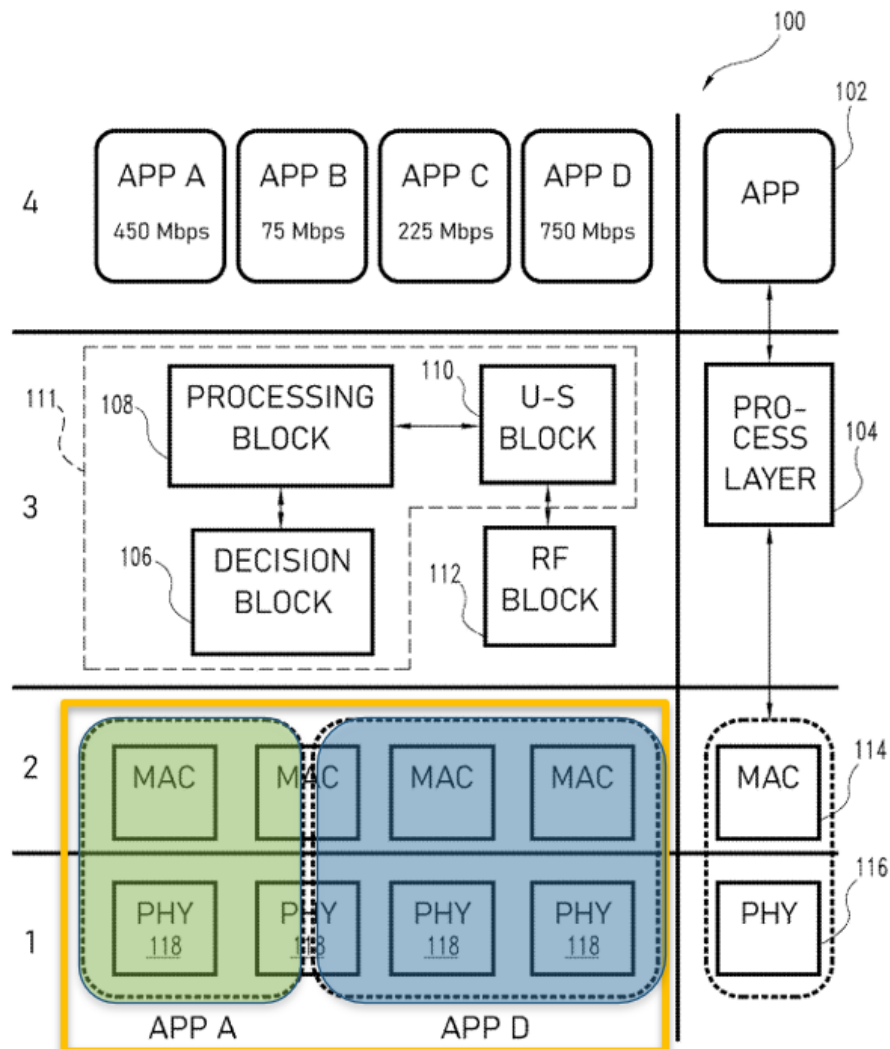
break” rather than “break before make.” EX2008 (Akl), ¶119; *see* Section V.A.5. In effect, “without requiring disassociation” is a positive limitation indicating to a POSITA that a system would employ “make before break.” *Id.*

EX1001, Fig. 1 (annotations added). The use by each application of multiple radios/transceivers by each application indicates to a POSITA that “make before break” is being employed. EX2008 (Akl), ¶118. Further, a POSITA would understand that the ’564 patent’s disclosure describing the functioning of the virtual MAC allows for make-before-break, because the virtual MAC allows for assignment of resources without needing a one-to-one correspondence, and without requiring channel lock-out, as demonstrated by Figure 1—and in contrast to the break-before-make Wi-Fi standards cited in the “Background” section of the specification. EX1001, 1:46-53, Fig. 1; EX2008 (Akl), ¶118. This is demonstrated by portions of the ’564 specification such as the disclosure “[b]y employing a virtual MAC and virtual PHY between an application layer and an actual MAC and PHY layer, wireless transceiver resources may be allocated more efficiently to handle various data bandwidth requirements from different applications” and “should a given resource be unavailable, such as through insufficient bandwidth or having an existing assignment, a replacement resource may be identified and assigned.” EX1001, 5:5-8, 6:4-8; EX2008 (Akl), ¶118. Thus, the “without requiring disassociation” limitations are supported by adequate written description.

7. The claim term “do not prevent” is supported by adequate written description.

Finally, the Petition asserts that the “do not prevent” claim limitation lacks adequate written description. Pet. at 94-97. This argument is puzzling, since the “do not prevent” limitation is depicted in Figure 1, disclosed in the ’216 provisional, and described in the ’564 patent specification.

The limitation at issue recites “wherein ... the wireless networking device’s utilization of the first and second identified bandwidth portions do not prevent any wireless networking device from utilizing a range of frequencies corresponding to the remaining portion of the bandwidth availability of the first wireless transceiver...” EX1001, 13:5-13. A POSITA would understand this limitation to express the ability for resource sharing of the various actual PHY interfaces or the transceivers depicted in Figure 1—including as being shared by two applications:



EX1001, Fig. 1 (annotations added); EX2008 (Akl), ¶121.¹⁸ As confirmed by explanation to the Office in the August 8, 2023 remarks, the '216 provisional

¹⁸ Again, the “do not prevent” limitations are not negative limitations. They suggest a different structure—resource sharing in a make-before-break system—rather than a type of absence, and are like “without requiring disassociation” a positive limitation. *See supra*, n.17; EX2008 (Akl), ¶122.

explains that as “shown in Fig. 1, a physical resource can be shared.” EX1017 at 558.

As with the “without requiring disassociation” limitation, a POSITA would understand that the operation of the virtual MAC of the ’564 patent and its use of virtual (software-based) addressing discloses the ability to assign resources that is not a one-to-one correspondence with the manufacturer’s assigned address, and without any channel lock-out. EX2008 (Akl), ¶122. Just as this allows for “make-before-break” capability, it also allows for resource sharing by multiple wireless networking devices. *Id.*

Further, contrary to the Petition and Dr. Almeroth’s naked assertions that Figure 1 only shows a downlink transmission to a single client (Pet. at 96; EX1002, ¶¶234-235), a POSITA would understand that Figure 1 shows an uplink and downlink transmission where two clients (e.g., two phones) are sharing a single access link. EX2008 (Akl), ¶123 (citing EX1001, 4:12-19). Finally, as explained above, a POSITA would understand that the ’216 provisional and the ’564 patent both disclose evaluation of available bandwidth. *See* Section VI.B.2, *supra*.

The Petition offers nothing but citationless assertions from its expert to argue about disclosure he does not claim to have reviewed. The evidence put forward in the Petition fails to demonstrate that it is more likely than not that the “do not prevent” limitations, or any contested limitation, lack adequate written description.

C. The Petition Fails to Demonstrate that the '564 Patent's Claims are Indefinite.

The Petition claims that various limitations of the '564 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 terms "partially simultaneously" and "substantially simultaneously" are not indefinite.

The Petition complains that the claim terms "partially simultaneously" (claims 15, 18, 20, 22, 26 and 28) and "substantially simultaneously" (claims 19, 21, 23, 24, 25, 27, and 29) are indefinite because they are terms of degree.¹⁹ Pet. at 97-99.

First, there is no issue with the claim term "substantially simultaneous." A POSITA would understand that simultaneous transmission means transmission at

¹⁹ Both the Petition and Dr. Almeroth call these "a 'term of degree'-upon a – 'term of degree,'" but neither explains what that means or what effect it has and why. Pet. at 98; EX1002, ¶240.

the same time, but also that it is impossible for two parallel transmissions to be perfectly simultaneous. EX2008 (Akl), ¶125. Therefore, a POSITA would understand that transmission that is “substantially simultaneous” reflects this reality.

Id.

Federal Circuit case law has long been consistent. “It is well established that when the term ‘substantially’ serves reasonably to describe the subject matter so that its scope would be understood by persons in the field of the invention, and to distinguish the claimed subject matter from the prior art, it is not indefinite.” *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002); *see also id.* (“Expressions such as ‘substantially’ are used in patent documents when warranted by the nature of the invention, in order to accommodate the minor variations that may be appropriate to secure the invention.”). Indeed, “substantially” and similar terms are “‘commonly used in patent claims to ‘avoid a strict numerical boundary to the specified parameter.’” *Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1367 (Fed. Cir. 2001) (quoting *Pall Corp. v. Micron Separations*, 66 F.3d 1211, 1217 (Fed. Cir. 1995)); *see also Andrew Corp. v. Gabriel Elecs., Inc.*, 847 F.2d 819, 822 (Fed. Cir. 1988) (“Neither the record nor the law supports Gabriel's position that one of ordinary skill in the art would not know when the RPEs were ‘substantially equal’ or ‘closely approximate’.”). There is no need to understand whether it should be to

the microsecond or millisecond (Pet. at 98)—the Federal Circuit does not require this level of specificity for the term “substantially.”

The Petition also complains that “partially” and “substantially” must have different scopes, without objective bounds. Pet. at 98-99. But while the terms do have different scopes, a POSITA would understand “partially simultaneously” and “substantially simultaneously” to be different ways of describing parallel transmissions taking place across a single transmission opportunity, or TXOP—with the TXOP itself providing the objective bounds. EX2008 (Akl), ¶125; *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. EX2008 (Akl), ¶125 (citing EX2010 at 309). Meanwhile, a POSITA would understand that the “substantially simultaneously” limitations are satisfied because a transmission cannot be perfectly simultaneous, but where the parallel transmission is essentially overlapping, such as where the two transmissions include a similar amount of data to be transmitted across a single TXOP. *Id.*

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” or “substantially simultaneously.”

2. The claim term “better than” is not indefinite.

The Petition asserts that the claim term “better than” is indefinite because it is subjective and dependent on “one person’s opinion.” Pet. at 99-101. But a POSITA would have no trouble understanding the scope of the claim—and that it claims that the processing interface evaluates the data transfer characteristics of different bandwidth portions and selects the one that will achieve the transmission more effectively. EX2008, (Akl), ¶128.

The Petition and Dr. Almeroth assert that “there are many different metrics for evaluating data transfer characteristics,” and that “[a] POSITA would not be able to evaluate which link is better without knowing which metric to use for that determination.” Pet. at 100 (citing EX1002, ¶246)). But a POSITA would understand that the characteristics the Petition lists (and indeed, the many a POSITA would be aware of) including “levels of bandwidth, received signal strength, frame packet error rate, frequency offset, and latency” would almost always be better or worse together—such that whatever metric was used or whatever data characteristic might be highlighted, the bandwidth portion with “better” characteristics would be the same. EX2008, (Akl), ¶130 (citing EX2010 at 94-95). Moreover, in the rare instances of conflict, such as the hypothetical posed by Dr. Almeroth, “where link A may indicate a stronger received signal than link B, but link B indicates a lower frame packet error rate” (Pet. at 100 (citing EX1002, ¶246)), a POSITA would easily

understand a hierarchy of characteristics. EX2008, (Akl), ¶131. A POSITA would understand that the most important data characteristics are error rate, latency, and throughput, which all indicate the success of the transmission. *Id.* Meanwhile, other characteristics such as signal strength are only a means to the end of the transmission. *Id.* Therefore, a POSITA would have no trouble understanding that, in Dr. Almeroth's hypothetical, the lower packet error rate would be more important than the stronger received signal, and the bandwidth portion with the lower error rate would be "better." *Id.*

Therefore, a POSITA would understand the scope of the claim term that describes evaluation of data transfer characteristics of multiple bandwidth portions and a determination of which are "better." This is not a circumstance where the term "better than" implies a subjective opinion that could change from person to person, but rather a comparison that would be readily understood by a POSITA using objective measures, and where results would not be variable. "[P]atents are written by and for skilled artisans." *S3 Inc. v. NVIDIA Corp.*, 259 F.3d 1364, 1371 (Fed. Cir. 2001) (quoting *Vivid Techs., Inc. v. Am. Science & Eng'g, Inc.*, 200 F.3d 795, 804 (Fed. Cir. 1999)). In this case, a skilled artisan would understand with reasonable certainty the scope of the "better than" limitations.

3. The error the Petition identifies in claim 27 will be corrected in the district court.

The Petition correctly identifies a typographic error in the claim language of claim 27—it refers to “the first and second wireless transceivers” when it should refer to “the second and third wireless transceivers” of claim 26. Pet. at 101-102; EX1001, 16:38-52. Claim 26 recites that the processing interface will cause the transmission of a second data stream from the recipient to “the second and third wireless transceiver.” EX1001, 16:38-49. Claim 27 depends from Claim 26, but refers to the “second data stream” as being received by “the first and second wireless transceivers.” *Id.*, 16:49-52.

This is a typographical error—not a cause of indefiniteness. Moreover, Patent Owner intends to correct this error in the course of the co-pending district court proceedings. *Novo Indus., L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1357 (Fed. Cir. 2003) (noting that a district court may correct “obvious minor typographical and clerical errors in patents”); *see also Grp. One, Ltd. v. Hallmark Cards, Inc.*, 407 F.3d 1297, 1303 (Fed. Cir. 2005) (explaining that district courts may correct errors which are “evident from the face of the patent”); *Ultimax Cement Mfg. Corp. v. CTS Cement Mfg. Corp.*, 587 F.3d 1339, 1353 (Fed. Cir. 2009) (discussing standards for correction).

The Petition does not show Claim 27 is indefinite—it merely points out a typographical error that will be corrected in due course in a different forum. That is no reason to institute the PGR, and in fact, demonstrates that these issues are better resolved in the district court. *See* Paper 8 (Patent Owner’s Memorandum in Support of Discretionary Denial).

VII. CONCLUSION

The Petition does not establish that it is more likely than not that any of the challenged claims is unpatentable. Institution should be denied.

Dated: November 3, 2025

Respectfully Submitted,

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WORD-COUNT CERTIFICATE

The undersigned certifies that the foregoing Patent Owner's Preliminary Response complies with the type-volume limitation of 37 C.F.R. § 42.24(a) and (b) and contains 18,340 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: November 3, 2025

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CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing Patent Owner's Preliminary Response was served on November 3, 2025, by electronic mail to Petitioners' counsel at the following addresses indicated in Petitioners' Mandatory Notices:

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