

Filed on behalf of: Netgear, Inc.

Entered: December 13, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TP-LINK CORPORATION LIMITED,
Petitioner,

v.

NETGEAR, INC.,
Patent Owner.

Case IPR2023-01393
Patent 7,936,714 B1

**PATENT OWNER'S
PRELIMINARY RESPONSE**

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Exhibit List

Exhibit	Description
2001	Declaration of Zygmunt J. Haas (“Haas Decl.”)
2002	<i>Curriculum Vitae</i> of Zygmunt J. Haas (“Haas CV”)
2003	Netgear, Inc., <i>Disclaimer in a Patent Under 37 C.F.R. § 1.321(a)</i> , filed December 8, 2023, with the U.S. Patent and Trademark Office regarding U.S. Patent No. 7,936,714 (“’714 Patent Disclaimer”), including Acknowledgement of Receipt and Electronic Payment Receipt

I. Introduction

Patent Owner Netgear Inc. respectfully submits this Preliminary Response to the Petition for *inter partes* review (“IPR”) of U.S. Patent No. 7,936,714 (“’714 patent”), filed by TP-Link (“Petitioner”). As explained below, Petitioner has failed to carry its burden to show a reasonable likelihood that at least one of the challenged claims is unpatentable. Thus, the Board should deny the Petition, and no IPR proceeding should be instituted.

The ’714 patent describes and claims innovative methods for increasing capacity in wireless data communication systems, by *inter alia*, transmitting data on one frequency band and receiving data in a second frequency band, separated by at least an octave from the first band, with at least a portion of the transmission and reception occurring “*at the same time*” (independent claims 1, 13) or “*during the same communication session*” (independent claims 31, 32). These “same time” and “same communication session” limitations were the reasons that, after nearly nine years of prosecution, the Board of Patent Appeals and Interferences (“BPAI”) determined the ’714 patent claims were nonobvious over the prior art. Ex. 1004 (“’714 File History”), 455-57. These limitations are why the Petition should be denied too.

The Petition sets forth two single-reference obviousness grounds against independent claims 1, 13, 31 and 32 of the ’714 patent. Both grounds fail for the

same reason. Like the prior art the BPAI considered during prosecution, Petitioner has not shown that either Morikawa (Ground 1) or Serizawa (Ground 2) disclose transmission and reception occurring on the claimed separate frequency bands *at the same time or during the same communication session*. Petitioner tries to fill those holes with hindsight-driven interpretations of Morikawa's and Serizawa's figures as indicating the possibility of simultaneous transmission and reception. But those interpretations are wrong. For example, Morikawa and Serizawa describe the relevant figures as depicting transmission and reception occurring sequentially in time. And the BPAI already considered—and rejected—that a prior art reference, Mangal, having two separate radios discloses or renders obvious the “same time” and “same communication session” limitations of the asserted claims. Petitioner provides no basis to deviate from the BPAI's conclusion, as the Petition does not provide any motivation for a POSA to implement Morikawa or Serizawa using same time operation as the '714 patent claims require.

Ground 3 addresses only dependent claims and relies on the same Serizawa base reference as Ground 2, and therefore fails for the same reasons.

Accordingly, Patent Owner respectfully submits that institution should be denied.

II. Background

A. The '714 Patent

The '714 patent is titled "Spectrum Allocation System and Method for Multi-Band Wireless RF Data Communications." The specification discloses "systems and methods for providing wireless data transmission spectrum allocation by utilizing separate bands for upstream and downstream wireless data communication." Ex. 1001 ("'714 Patent"), 3:30-33.

The '714 patent first discusses the conventional approach of using a single band for upstream and downstream communication. For example, with frequency division duplexing ("FDD"), where "systems utilize **one frequency band** of operation, generally, transmitting and receiving on separate frequencies within **the same basic band**." *Id.* 1:30-33 (emphasis added). Alternatively, time division duplexing ("TDD") allows a base station to "transmit[] part of the time on a frequency, and then a subscriber transmits part of the time on **the same frequency**." *Id.* 1:48-53 (emphasis added). Thus, with TDD, the upstream and downstream took turns using the frequency band rather than operating at the same time. But with either TDD or FDD, the typical approach was to have the upstream and downstream in the same frequency band. Ex. 2001 ("Haas Decl."), ¶¶ 28-29. The '714 patent explains that "[t]he **band** utilized for communication in such prior

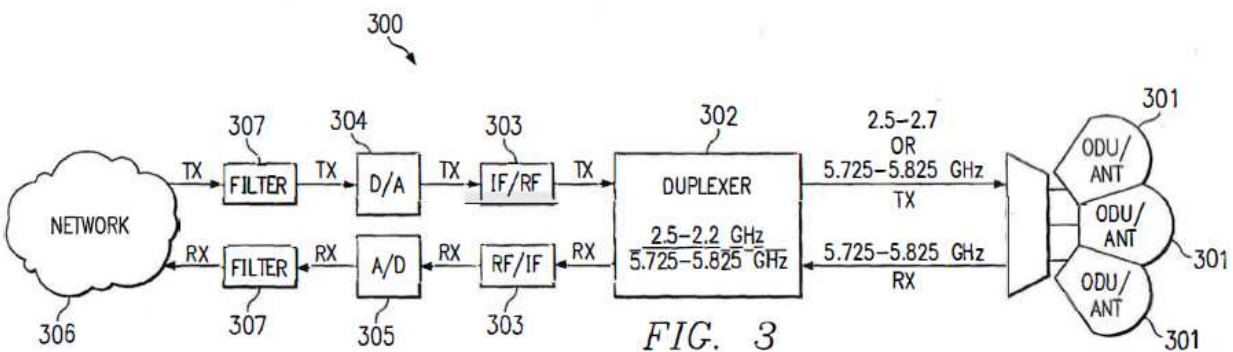
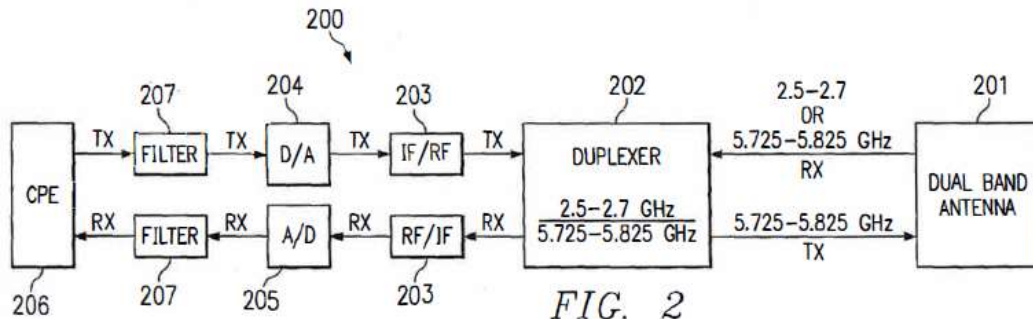
art systems may be a licensed band **or** it may be an unlicensed band”—not both.

'714 Patent 1:40-47.

According to the '714 patent, “[a] problem that many wireless data communication system operators face is a need to provide the highest possible data rates to subscriber units[,]” which was limited by operation on a single frequency band. *Id.* 3:9-11. To overcome this, the '714 patent teaches “methods for providing wireless data transmission spectrum allocation by utilizing separate bands for upstream and downstream wireless data communication.” *Id.* 3:30-32. “By utilizing separate bands, particularly bands separated by an octave or more, the present invention increases the efficiency and capacity of a wireless data communication system by allowing use of the full bandwidth available, in each band, to an operator.” *Id.* 4:18-22.¹ This “allows an operator to use any band to which the operator has access.” *Id.* 3:56-64 (“If the operator has licenses in more than one band the present invention allows the operator to make efficient use of these licenses.”).

¹ As the '714 patent describes, “a frequency octave is a doubling of frequencies. In other words, an octave is an interval between two frequencies having a ratio of two-to one.” *Id.* 4:22-25.

The '714 patent discloses diagrams for a subscriber station and a hub station in Figures 2 and 3 (reproduced below), respectively. Both systems include dual-band or multi-band duplexers that employ appropriate filtering to enable simultaneous transmission and reception on multiple bands. *Id.* 7:26-28, 8:21-22.



'714 Patent, Figures 2 and 3

As opposed to prior art duplexers, which operated on frequencies within the same band, the dual band duplexers “operate[] in two separate bands of operation.” *Id.* 7:52-55; *see also id.* 8:56-60.

Importantly, the '714 patent further explains that “[t]ypically, in the prior art, FDD frequency separation is less than one percent of frequency. For example

prior art FDD transmission frequencies at around one GHz would traditionally be separated by less than ten MHz.” *Id.* 4:31-36. In contrast, the invention of the ’714 patent “allows spectrum, which does not have sufficient bandwidth to provide one percent frequency separation between upstream and downstream frequencies, as typically required to use FDD, to be used for broadband data transmission.” *Id.* 4:37-41.

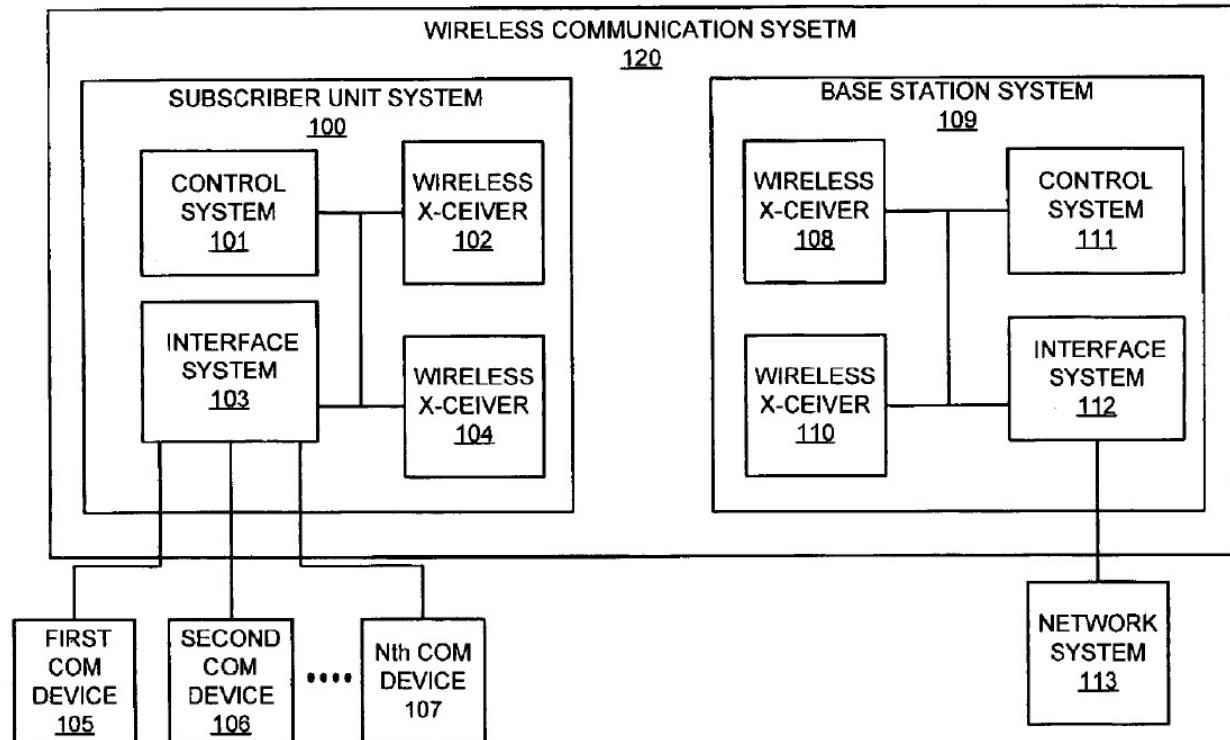
B. Prosecution History

The ’714 patent was issued from U.S. Application 10/095,307, which was filed on March 11, 2002. ’714 Patent, Cover. Prosecution lasted more than nine years, including two appeals to the BPAI and seven prior art searches by the Examiner and the Board. ’714 File History 53, 67, 93, 130, 221, 290-92, 329, 465.

For prior art rejections, the Examiner initially focused on the Arnold reference (U.S. Patent No. 5,475,677), alone or in combination with the Sugita reference (U.S. Patent No. 5,852,767). *Id.* 121, 125. The Applicant appealed the Examiner’s final rejections to the BPAI (*id.* 134), arguing among other things that the Arnold reference failed to teach or suggest transmitting on one band while receiving on another. *Id.* 137 (“Appellant notes that Arnold does not teach or suggest the desirability of transmitting in a licensed band while receiving signals in an unlicensed band, or the reverse.”). In partially affirming the Examiner, the Board noted that the “Appellants do not point to claim language that requires

transmitting *while* receiving and [its] review of the [then-pending] claims find[s] no such limitation.” *Id.* 244 (original emphasis). The Board also introduced the Mangal reference (U.S. Patent No. 6,801,519 (Ex. 1018, “Mangal”)), using it as an additional ground for rejection. ’714 File History 221, 252.

After the first appeal, the Applicant presented new claims—the claims that were allowed and are challenged in the Petition—expressly requiring transmitting and receiving on the two separate bands at the same time or in the same communication session. *Id.* 260-64 (*see, e.g.*, claim 41), 296-97 (amending claim 40 to incorporate claim 41). The Examiner conducted another prior art search and applied Mangal against the new claims, relying on the communication system shown in Figure 1 of Mangal, reproduced below. *Id.* 316, 329. Mangal’s devices (like the references asserted in the Petition) included separate transceivers for communicating data on licensed and unlicensed bands, with wireless transceivers 102 (subscriber unit) and 108 (base station) for licensed frequency bands, whereas transceivers 104 (subscriber unit) and 110 (base station) were for unlicensed frequency bands.

**Mangal, Figure 1**

As to the new limitations requiring data to be transmitted and received “at the same time” or “in the same communication session,” the Examiner stated that Mangal “substantially” taught same time transmission and reception because “providing communication service, using the same MAC control frame, as shown on Fig. 2 and 5:24-30, utilizing licensed and unlicensed frequency bands, inherently performing receiving and transmitting operation almost at the same time, because almost simultaneous bi-directional communication is essential for the system operation with real-time services[.]” ’714 File History 316-17.

The Applicant again appealed to the BPAI, arguing that “Mangal does not discuss the possibility of having both the licensed and unlicensed allocation sub

frames of the MAC frame format being used at the same time, and therefore, cannot satisfy the claims.” *Id.* 372. The BPAI reversed the Examiner. *Id.* 454-55. The Board “agree[d] with Appellants” that “Mangal, at best, discloses bidirectional communication occurring entirely in only one of a low interference band *or* a high interference band at the same time, and not simultaneously in both bands.” *Id.* 456 (original emphasis). After the reversal, the Examiner allowed the claims. *Id.* 458-63.

Although the Examiner did not consider Morikawa or Serizawa during prosecution (*see* ’714 Patent, Cover), Petitioner has not established a reasonable likelihood that those references disclose or render obvious the claimed data transmission and reception “at the same time” or “during the same communication session,” either.

C. Person of Ordinary Skill in the Art

For the ’714 patent, a person of ordinary skill in the art would be a person with a bachelor’s degree in a technical field such as electrical engineering, computer engineering, computer science, or physics, and/or 2-3 years of relevant practical experience in wireless communication, data communication, or wireless networking systems. Hass Decl. ¶ 25.

D. Claim Construction

Petitioner asserts that “the Board does not need to construe any claim term for purposes of resolving the issues presented in this Petition.” Pet. 11. For the purposes of this Preliminary Response, Patent Owner agrees that no terms need to be construed because Petitioner failed to show that any Grounds have a reasonable likelihood of prevailing under any reasonable construction, including their plain meaning.²

III. The Claims Are Not Obvious Over Morikawa (Ground I)

Petitioner has not shown a reasonable likelihood that Morikawa discloses or renders obvious “wherein at least a portion of said receiving and at least a portion of said transmitting occur at the same time” in claims 1 and 13, and “wherein said transmitting and said receiving occur during the same communication session” in claims 31 and 32. The Petition does not differentiate between these limitations, making the same arguments for each of elements [1.4], [13.4], [31.4], [32.4]. *See* Pet. 38-40. Those arguments fail for the same reasons.

The Petition does not identify any express disclosure in Morikawa of same time/same session data transmission and reception, and attempts to fill that gap

² Patent Owner reserves the right to advocate for claim constructions in the event the Board institutes review in this case.

based on interpretations drawn from Morikawa's figures, other unrelated references, or the knowledge of a POSITA. Those hindsight driven arguments should be rejected. As discussed below, Morikawa describes sequential rather than simultaneous transmission and reception on its different frequency bands.

Petitioner's challenge of dependent claims 2-5, 11, 12, 14-17, 23-24 rely on Petitioner's challenge of claims 1 and 13 respectively and fall short for the same reasons. Accordingly, Petitioner has not demonstrated a reasonable likelihood that it would prevail in its challenge of claims 1-5, 11-17, 23-24, 31, and 32.

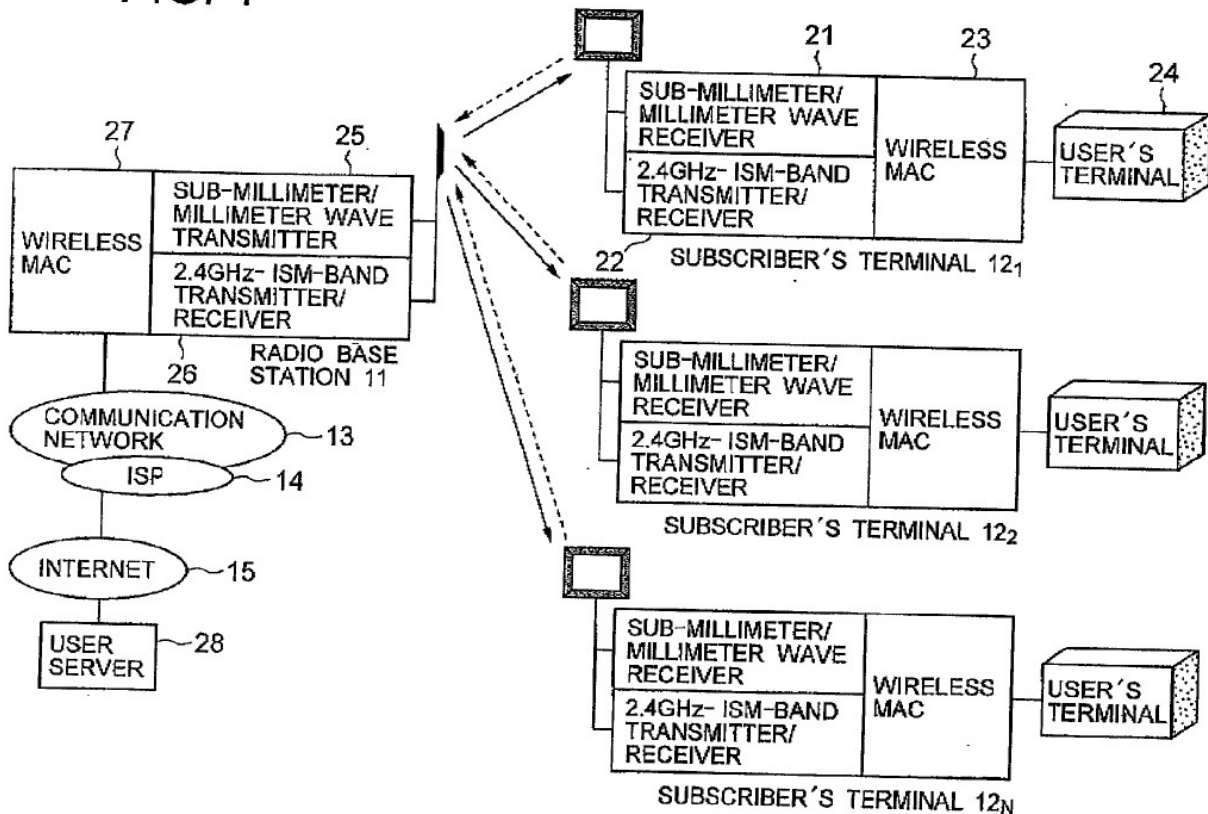
A. Summary of Morikawa

Morikawa is titled "Point-to-Multipoint Wireless Access System" and discloses "a point-to-multipoint wireless access system that can be used in the case where the usable frequency band is narrow so that a broadband transmission is not suited or where a low-cost, high-speed transmission is desired." Ex. 1005 ("Morikawa"), [0016]. Morikawa repeatedly emphasized its "low cost" design goal. *Id.* [0006] ("[I]t is difficult to realize a cost effective wireless access system."), [0010].

Morikawa illustrates a wireless access system, shown in Figure 1 below where "the down-link channel from the wireless base station to the subscriber's terminal uses a frequency band corresponding to a sub-millimeter waveband or millimeter waveband . . . and the up-link channel from the subscriber's terminal to

the wireless base station uses an 2.4-GHz ISM band that does not need a license from the authority.” *Id.* [0025].

FIG. 1



Morikawa, Figure 1

- B. Morikawa does not disclose or render obvious “wherein at least a portion of said receiving and at least a portion of said transmitting occur at the same time.”**

The Petition argues that Morikawa discloses or renders obvious the challenged claims “same time” and “same communication session” elements because a POSA would have (1) concluded that Morikawa’s separate uplink and downlink frequency bands can be equated with frequency division duplexing or FDD operation, (2) interpreted Morikawa’s Figure 1 as disclosing same time

operation, and (3) found same time operation obvious because Figure 1 “allow[s] for concurrent” operation on uplink and downlink frequencies. Each argument fails.

1. Morikawa does not disclose FDD

Petitioner first asserts that because Morikawa discloses “separate uplink and downlink frequency bands,” a POSITA would conclude that Morikawa also discloses a “multiple access technique, called frequency division duplexing or FDD.” Pet. 24. Not so.

Petitioner does not identify any disclosure in Morikawa describing its system as FDD, and the term does not appear in Morikawa. *Cf. id.* 24-26; Ex. 1002 (Ding Decl.), ¶¶ 85-87. Instead, Petitioner cites a different reference, Razavi, that states “frequency-division duplexing” (FDD) can “employ two different frequency bands for the transmit and receive paths.” Pet. 25 (emphasis omitted) (quoting Ex. 1015 (“Razavi”), 103³). Petitioner provides no explanation as to why Razavi’s disclosures mean that Morikawa utilizes FDD (it does not). Nor does Petitioner argue that a POSA would have been motivated to modify Morikawa in view of Razavi to implement FDD.

³ Citations to Razavi refer to the document’s original pagination.

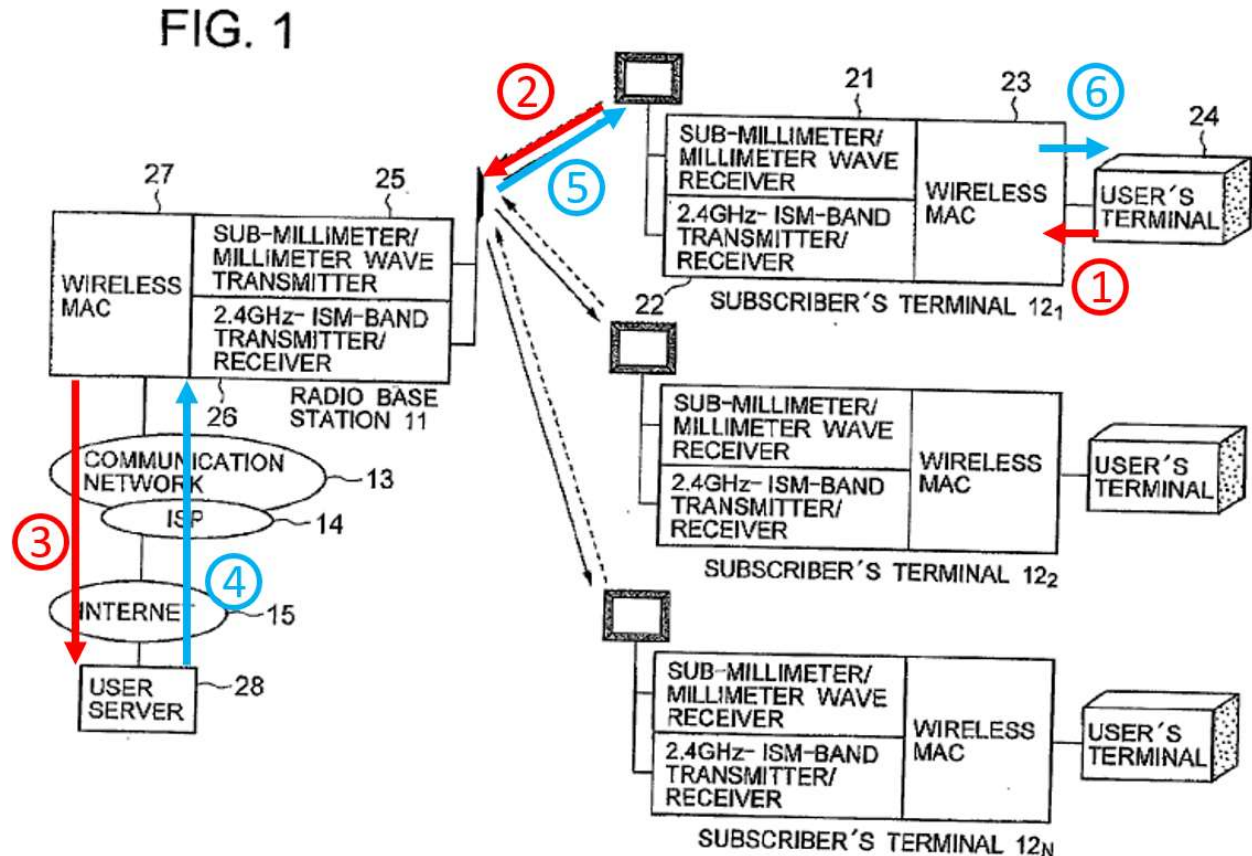
To the contrary, Razavi explains that systems using FDD require “bandpass filters to isolate the two paths” in order to allow “simultaneous transmission and reception.” Razavi 103. In Morikawa, there is no disclosure of any of these “bandpass filters,” necessary for simultaneous transmission and reception, nor does Petitioner provide any motivation for a POSA to add them. *See* Pet. 24-26. A POSA reading Morikawa thus would have understood Morikawa does *not* disclose FDD, which Petitioner equates to simultaneous transmission and reception. Haas Decl. ¶ 61.

2. Morikawa's Figure 1 does not disclose same time transmission or reception

Petitioner asserts that “a POSITA would have understood and found obvious that the separate receiver and transmitter units at each subscriber's terminal allow for concurrent, two-way, uplink and downlink transmissions over separate frequency bands.” Pet. 26 (citing Ex. 1002, ¶ 87). Petitioner further asserts Figure 1 of Morikawa “confirms” this simultaneous operation because the arrows in the figure illustrate “two-way communication.” *Id.* 25-26.

Morikawa contradicts Petitioner's interpretation of Figure 1. Morikawa describes the “[o]peration of the wireless access system of FIG. 1” in paragraphs 32 through 44. Morikawa [0032]. Described in detail below, this operation can be summarized as an initial request sent over the 2.4-GHz uplink, *followed by* the requested data being transmitted to the user over the sub-millimeter/millimeter

waveband downlink. Haas Decl. ¶ 71. Dr. Haas annotates Figure 1 of Morikawa (reproduced below), to allow for convenient visualization of this sequential transmission, with steps corresponding to uplink transmission in red and downlink in blue. *Id.* ¶ 65.



Haas Declaration ¶ 65 (annotating Morikawa Figure 1)

Starting with the first step (1), the user's terminal 24 transmits a request packet to the Ethernet for requesting the user server 28 of transmission of desired data. Morikawa [0033]. Then, at annotated step (2), the request is, after being processed and formatted by the wireless MAC unit 23, "transmitted through the

2.4-GHz transmitter unit 22.” *Id.* [0035]. The packet is then “received by the 2.4-GHz receiver unit 26 in the wireless base station 11.” *Id.* [0036]. At step (3) the wireless base station 11 recovers the request packet, it sends the request packet to the user server 28 over the Internet 15. *Id.* [0038]-[0039].⁴

Following step (3), the downlink process in blue begins. At step (4), the user server responds with a response packet group, sent back to the wireless base station 11. *Id.* [0039]-[0040]. At step (5), the wireless base station 11 formats and transmits the response packet group over the sub-millimeter/millimeter waveband. *Id.* [0041]-[0042]. Finally, at step (6), the wireless subscriber’s terminal receives the response with its sub-millimeter/millimeter waveband receiver 21, where the response packet group is restored and sent to the user’s terminal via Ethernet. *Id.* [0042]-[0043]; Haas Decl. ¶¶ 65-70.

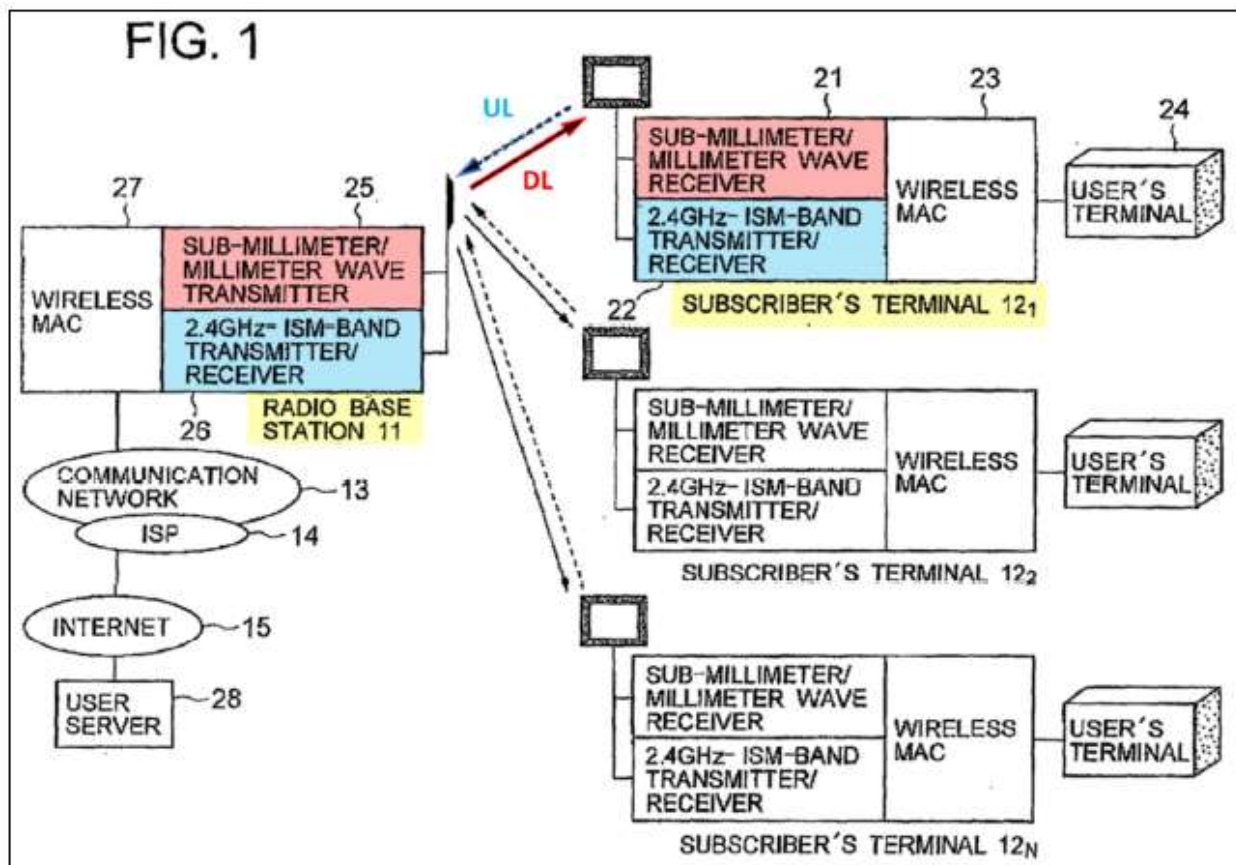
⁴ Morikawa paragraph 37 describes an embodiment where an acknowledge (ACK) signal is transmitted on the 2.4-GHz downlink in response to the request message. Petitioner expressly disclaimed any reliance on the embodiment where the base station has a 2.4-GHz transmitter such that there is two-way communication at 2.4-GHz. Pet. 22 n.6. But this embodiment does not disclose the claimed limitation even if Petitioner had relied on it. Haas Decl. ¶ 66 n.3.

Thus, contrary to the Petition's interpretation of Figure 1, a POSA would have understood from Morikawa's description that the 2.4-GHz and sub-millimeter/millimeter waveband transmitters and receivers operate *sequentially* in the above disclosure of Morikawa. Haas Decl. ¶ 69. There are two wireless transmissions: a request transmitted in the 2.4-GHz uplink (Morikawa [0035]-[0036]), and a response group transmitted in the sub-millimeter/millimeter waveband downlink (*id.* [0041]-[0042]). The request necessarily precedes the response such that the uplink request does not overlap even partially with the downlink response. Haas Decl. ¶ 69. In fact, the uplink request must first be "restored" by the wireless base station 11 before it can be forwarded to the user server over the Internet. Morikawa [0036]. Further, the server's response to the request must be "converted" by the wireless base station MAC for transmission over the sub-millimeter/millimeter waveband downlink before it is transmitted on the downlink.

These sequential steps preclude simultaneous operation of the 2.4-GHz uplink and sub-millimeter/millimeter waveband downlink in the described example because the full request must be received by the base station on the uplink before the user server can respond, and the full response group must be formatted by the base station before it can be transmitted on the downlink. Haas Decl. ¶ 69. Morikawa repeats this same sequential example for all of its disclosed

embodiments. *See* Morikawa [0049]-[0060] (Fig. 2), [0064]-[0074] (Fig. 3), [0078]-[0088] (Fig. 4). In contrast, Morikawa is devoid of any disclosure of simultaneous operation of uplinks and downlinks. Haas Decl. ¶ 72.

Nothing in Figure 1 would lead a POSA to a different conclusion. Petitioner argues that the “separate receiver and transmitter units at each subscriber’s terminal” in Figure 1 (reproduced below with Petitioner’s annotations), “allow[s] for concurrent, two-way, uplink and downlink transmissions over separate frequency bands.” Pet. 26.



Morikawa, Figure 1 (as annotated at Petition page 25)

But the use of separate receive and transmit units does not disclose or render obvious simultaneous transmission. Haas Decl. ¶ 60. As discussed above, Petitioner's Razavi reference indicates that simultaneous transmission and reception on different bands requires the use of "two front-end bandpass filters," which Morikawa's Figure 1 does not disclose. The conclusion that separate radios does not disclose or render obvious "same time" transmission and reception was also confirmed by the BPAI when it found the '714 patent claims nonobvious over Mangal during prosecution.

In particular, Mangal's Figure 1, like Morikawa's Figure 1 relied on in the Petition, disclosed the use of separate radios for transmission and reception.

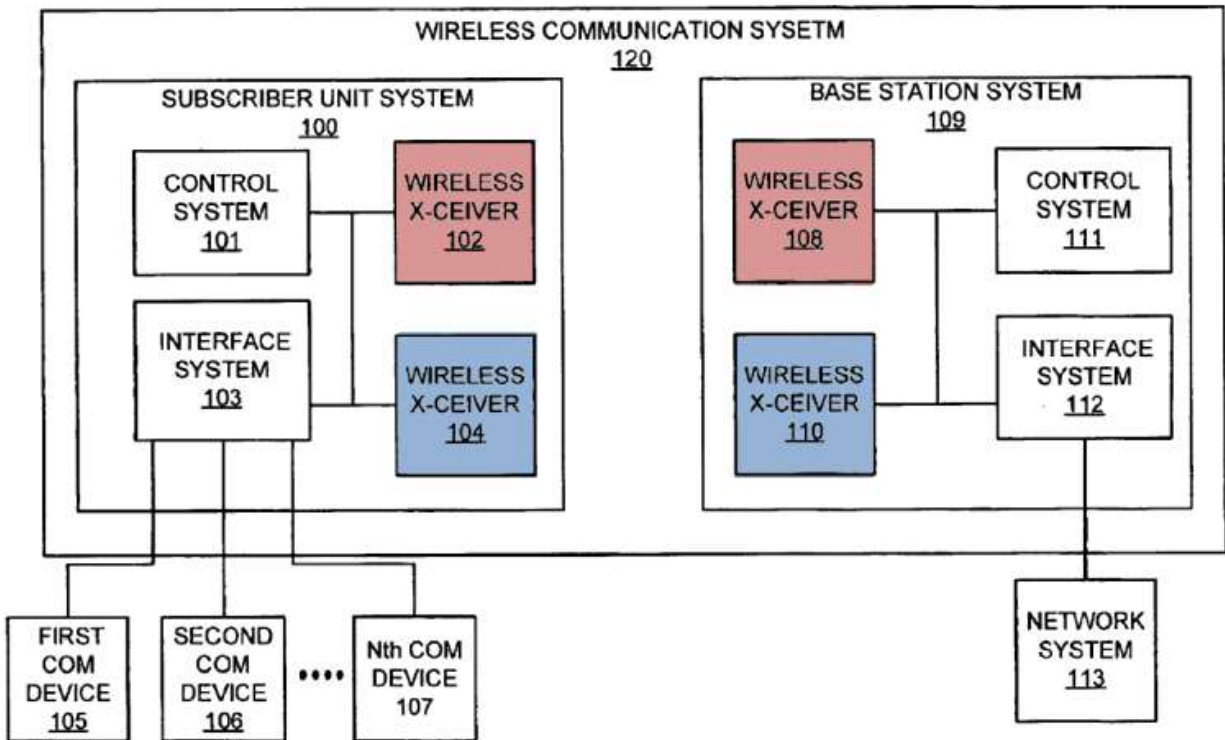


FIG.1

Haas Declaration ¶ 43 (annotating Mangal, Figure 1)

The Examiner expressly relied on Mangal's Figure 1 in rejecting the claims, including on appeal to the BPAI. '714 File History 401. But when the BPAI considered Mangal, it correctly concluded that, despite the disclosure of two separate radios, Mangal did *not* render obvious same time operation in the uplink and downlink. *Id.* 454 (BPAI overturning examiner); *see also id.* 484 (transcript of oral argument discussing Mangal Figure 1).

The same conclusion should follow with respect to Morikawa. In view of Morikawa's explicit disclosure of sequential operation, discussed previously,

Morikawa's use of separate radios does not teach or suggest simultaneous operation of the uplink and downlink. Haas Decl. ¶ 60.

Petitioner further asserts that simultaneous operation "is illustrated by the arrows (annotated UL and DL) in Morikawa Figure 1." Pet. 26. The Petition does not cite any corresponding description in Morikawa supporting this interpretation. *See id.* (citing only to Dr. Ding's declaration, Ex. 1002). There is none, because it is wrong. As Dr. Haas explains, arrows on a block diagram do not dictate timing of transmissions. Haas Decl. ¶¶ 62-63. As discussed previously, Morikawa's description of Figure 1 indicates that the arrows depict steps in a transmission cycle that occur sequentially, not at the same time.

3. The Petition Fails To Sufficiently Support Obviousness Of "Same Time" Operation

For the reasons discussed above, Morikawa does not disclose element [1.4]. As a backstop, the Petition also argues that this element would have been obvious in a single sentence: "[a]s explained by Dr. Ding, a POSITA would have understood and found obvious that the separate receiver and transmitter units at each subscriber's terminal allow for concurrent, two-way, uplink and downlink transmissions over separate frequency bands." Pet. 26 (emphasis added) (citing Ex. 1002, ¶¶ 87, 37). This conclusory argument should be rejected because it is factually unsupported and legally insufficient.

Although the Petition contends that Dr. Ding “explains” this obviousness contention, his declaration simply parrots the conclusion: “In my opinion, a POSITA would have understood and found obvious that the separate receiver and transmitter units at each subscriber’s terminal allow for concurrent, two-way uplink and downlink transmissions over separate frequency bands.” Ex. 1002, ¶ 87.⁵ The Board should not give Dr. Ding’s declaration any weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-16 (P.T.A.B. Aug. 24, 2022) (precedential) (expert testimony that is “conclusory and unsupported, [and] adds little to the conclusory assertion for which it is offered to support” is “entitled to

⁵ Petitioner also cites to paragraph 37 of Dr. Ding’s declaration, which merely discusses the background of the ’714 patent and is silent about anything about a POSITA’s understanding or obviousness in relation to Morikawa. Petitioner’s reliance on the ’714 patent to support its obviousness conclusion shows classic hindsight bias. *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011) (“Care must be taken to avoid hindsight reconstruction by using the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.”) (internal quotation marks and citations omitted).

little weight” especially when offered “to supply a limitation missing from the prior art”) (citations omitted).

The only sentence in paragraph 87 of Dr. Ding’s declaration that differs from the Petition is that “It would not make sense to view Morikawa as teaching one-way transmission at a time, because that would not support the most basic two-way communication.” Ex. 1002, ¶ 87. That assertion is not only unsupported, but also contradicted by Morikawa and Razavi. As discussed above, Morikawa describes using the uplink and downlink in a sequential manner for two-way communication, as discussed above. *See, e.g.*, Morikawa [0033]-[0042]; Haas Decl. ¶ 73. And the Razavi reference Dr. Ding relies on describes time-division duplexing (TDD) where uplink and downlink take turns, stating that “TDD allows direct (‘peer-to-peer’) communication between two transceivers[.]” Razavi 104. Thus, Dr. Ding’s (and the Petition’s) conclusory argument that “the most basic two-way communication” requires simultaneous operation of uplink and downlink should be rejected as unsupported hindsight. Haas Decl. ¶ 73.

Furthermore, even if one were to assume that Morikawa’s system “allows for” concurrent operation, which is wrong for the reasons discussed above, the *mere possibility* of a feature is legally insufficient to show obviousness. *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993-94 (Fed. Cir. 2017) (conclusion that a combination “would have allowed for” a claimed limitation “is not enough:

it does not imply a motivation to pick out those two references and combine them to arrive at the claimed invention”) (citations omitted). The Petition does not provide any basis for why a POSA “would have been motivated to make the combinations or modifications” to Morikawa to actually perform same time operation. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”) (original emphasis) (citation omitted). Indeed, the only contemporaneous evidence Petitioner cites is Razavi, which recites various problems with FDD including the need for “bandpass filters” causing signal quality loss as one of a “number of issues” and “drawbacks.” Thus, Petitioner has not made any sufficient legal argument for obviousness in relation to claim elements [1.4] or [13.4].

C. Independent Claims 31 and 32: Morikawa does not teach or suggest “wherein said transmitting and said receiving occur during the same communication session.”

Claims 31 and 32 are independent claims that recite “wherein said transmitting and said receiving occur during the same communication session.” ’714 Patent, cls. 31, 32. Petitioner relies on its flawed argument for claims 1 and 13 that “Morikawa teaches frequency division duplexing allowing concurrent, parallel transmission and reception of data over different frequency

bands during the same communication session.” Pet. 38, 39 (citations omitted).

Patent Owner showed above that Petitioner's analysis of Morikawa for claims 1 and 13 does not establish a reasonable likelihood of prevailing against those claims. For the same reasons, Petitioner failed to establish a reasonable likelihood of prevailing against claims 31 and 32 in Ground I.

D. Dependent claims 2-5, 11, 12, 14-17, 23, and 24: Petitioner failed to demonstrate a reasonable likelihood of prevailing against any dependent claim in Ground I.

Dependent claims 2-5, 11, and 12 depend from claim 1. As shown above, Petitioner failed to demonstrate a reasonable likelihood of prevailing against claim 1. For at least the same reasons, Petitioner failed to demonstrate a reasonable likelihood of prevailing against dependent claims 2-5, 11, and 12.

Dependent claims 14-17, 23, and 24 depend from claim 13. As shown above, Petitioner failed to demonstrate a reasonable likelihood of prevailing against claim 13. For at least the same reasons, Petitioner failed to demonstrate a reasonable likelihood of prevailing against dependent claims 14-17, 23, and 24.

IV. The Claims Are Not Obvious Over Serizawa (Ground II).

In Ground II, Petitioner makes similar arguments for Serizawa as its flawed Ground I arguments for Morikawa. For example, Petitioner mistakes Serizawa's disclosure for FDD and asserts that Serizawa discloses simultaneous uplink and downlink operation. In support, Petitioner again points to the existence of separate

transceivers and bi-directional arrows on system diagrams. Petitioner also relies on its expert, Dr. Ding, who again merely parrots the Petition and offers no new evidence or explanation. And just like in Ground I, Petitioner merely argues that simultaneous operation of uplink and downlink is *possible*, which is insufficient to prove obviousness.

A. Summary of Serizawa

Serizawa is titled “Radio Communication System Including SDL Having Transmission Rate of Relatively High Speed” and discloses “a radio communication system” that “mak[es] the downlink transmission rate relatively fast in comparison with the uplink[.]” Ex. 1006 (“Serizawa”), 3:50-53. Serizawa emphasizes design goals including low cost, low power consumption, small size, and safety for human use. *See, e.g., id.* 20:10-13 (“It is possible to make the influence of the terminal on a human being small, and to have a configuration which has low power consumption, small size, and low cost.”); *see also id.* 3:5-21.

Serizawa identifies forty-one embodiments in its disclosure. *See id.* 39:38-40 (“forty-first embodiment”). Petitioner relies on the fifteenth embodiment, which is illustrated in Figure 19, reproduced below. *See id.* 19:47-20:13. In this embodiment, the downlink transmission “is made on frequencies f1, f1’, f1” in the 60-GHz band at a transmission rate of R1.” *Id.* 19:53-56. In the uplink,

“transmission is made on frequencies f_2 , f_2' , and f_2'' ” in the 2.4-GHz band at a transmission rate of R_2 .” *Id.* 19:56-60.

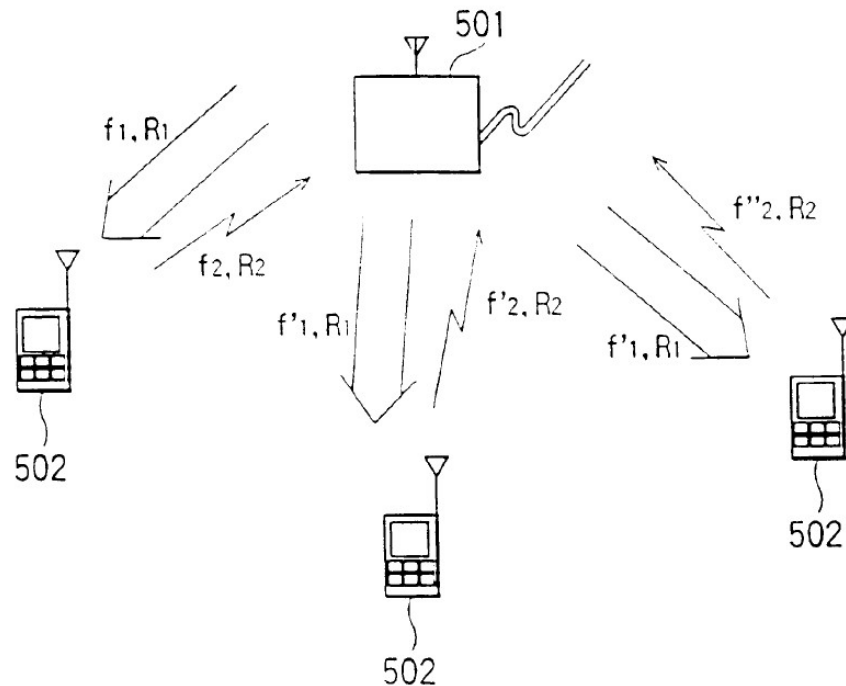


FIG. 19

Serizawa, Figure 19

Serizawa uses the term “frequency multiplexing” to refer to its use of different frequencies within a band (e.g., f_2 , f_2' , f_2'' in the uplink band) for different users, noting that it is used in “both the uplink and the downlink[.]” *Id.* 19:66-20:1.

Serizawa suggests sequential operation of the uplink and downlink, disclosing that “[t]he frequency placement at each of the terminals . . . is configured such that [uplink frequency] f_2 *follows* and corresponds to [downlink

frequency] f1 and such that [uplink frequency] f2' *follows* and corresponds to [downlink frequency] f1'." *Id.* 19:63-66 (emphasis added).

B. Serizawa does not teach or suggest “wherein at least a portion of said receiving an at least a portion of said transmitting occur at the same time.”

Relying on Serizawa's fifteenth embodiment, Petitioner first equates Serizawa's “frequency multiplexing” (FDM) with frequency division multiple access (FDMA). Pet. 46 (“Frequency multiplexing, also known as frequency division multiple access”) (citations omitted). Citing Razavi, Petitioner asserts that frequency multiplexing “is a technique that allows simultaneous transmission and reception over different frequencies.” *Id.* (citing Razavi 105) (discussing FDMA). Petitioner then cites to Figure 19 as illustrating simultaneous uplink and downlink transmission. *Id.* Thus, Petitioner conflates frequency division *multiplexing within* a link with frequency division *duplexing between* uplink and downlink. As explained below, Serizawa's fifteenth embodiment uses the former, not the latter, and does not disclose simultaneous operation of the uplink and downlink.

1. Serizawa's Fifteenth Embodiment Uses FDM, not FDD

Petitioner's citation to Serizawa's disclosure of “frequency multiplexing . . . on both the uplink and the downlink” does not disclose or suggest simultaneous operation of uplink and downlink. Serizawa 19:66-20:1. As Dr. Haas explains,

multiplexing is a general term in wireless communication referring to the method used to communicate multiple streams of data in a given direction. Haas Decl.

¶ 78. When streams are sent on different frequencies, those skilled in the art typically use the term “frequency *division* multiplexing” or FDM. *Id.* Further, when the different streams correspond to different users accessing a shared medium, allocation of different frequencies to different users is typically called “frequency division *multiple access*” or FDMA. *Id.*

Serizawa's use of the term “frequency multiplexing” refers to the fact that different users are assigned different frequencies on the uplink (f_2 , f_2' , and f_2'' , respectively, for the three users) and different frequencies on the downlink (f_1 , f_1' , and f_1'' , respectively, for the three users). *Id.* This explains why Serizawa describes frequency multiplexing being used “on *both* the uplink *and* the downlink.” Serizawa 19:66-20:1 (emphasis added). Because Serizawa's disclosure relates to how different users are allocated frequencies, a POSA would understand the disclosure of “frequency multiplexing” to be equivalent to both FDM and FDMA in this context. Haas Decl. ¶ 78; *see* Pet. 46 (equating Serizawa's “frequency multiplexing” with FDMA).

A POSA would understand the differences between multiplexing, multiple access, and *duplexing*. Haas Decl. ¶ 50. Specifically, duplexing refers to “the problem of two-way communication by a transceiver[.]” Razavi 103. In other

words, transceivers need to be able to transmit (e.g., in the uplink) and receive (e.g., in the downlink). Duplexing relates to the relationship between the uplink and downlink to allow the transceiver to both transmit and receive. Haas Decl.

¶ 46. Multiplexing, as explained above, relates to how multiple data streams can share a communications medium, and where those streams relate to different users, the problem is referred to as multiple access. *Id.* ¶¶ 48, 78.

Frequency division *multiple access* (FDMA) partitions a frequency band into “channels, each of which is assigned to one user.” Razavi 105. This allows multiple users to share the uplink bandwidth (when FDMA is used in the uplink) and to share the downlink bandwidth (when FDMA is used in the downlink). This is consistent with Serizawa’s disclosure that FDMA “is used on *both* the uplink *and* the downlink.” Serizawa 19:66-20:3 (emphasis added).

Notably, ***FDMA (or “frequency multiplexing”) is not FDD***. FDMA does *not* specify that uplink and downlink operate at the same time. Haas Decl. ¶¶ 50-53. That is, it does not teach or suggest any device is simultaneously transmitting and receiving. Rather, FDMA specifies what happens *within* an uplink, or *within* a downlink. *Id.* ¶¶ 50-52. This is in contrast with FDD, which as described by the ’714 patent, “[i]n FDD, a base station may simultaneously transmit and receive, and a subscriber station may simultaneously transmit and receive.” ’714 Patent 1:65-67. But prior art systems applied these principles “within the same basic

band.” *Id.* 1:30-33; *see also id.* 4:31-36 (“[I]n the prior art, FDD frequency separation is less than one percent of frequency.”). Serizawa does not disclose FDD.

Petitioner attempts to remedy this deficiency by asserting that “[f]requency ***multiplexing*** . . . is a technique that allows simultaneous transmission and reception over different frequencies.” Pet. 46 (citing Ex. 1002, ¶ 142; Razavi 105) (emphasis added). Petitioner’s assertion is misleading. To the extent Petitioner intends to argue that FDMA means the uplink and downlink operate simultaneously (or otherwise attempts to equate it to FDD), Petitioner is incorrect and has no support for such inference. Haas Decl. ¶¶ 50-53. Petitioner cites to Dr. Ding for this proposition, but Dr. Ding merely parrots the Petition without any further explanation or evidence. Ex. 1002, ¶ 142 (“Frequency multiplexing, also known as frequency division multiple access, is a technique that allows simultaneous transmission and reception over different frequencies.”) (citing Razavi 105).

Petitioner cites to Razavi’s discussion of FDMA at page 105, but Razavi does not support the idea that FDMA discloses or renders obvious simultaneous uplink and downlink operation. To the contrary, Razavi describes FDMA and FDD under separate sections, demonstrating that a POSA would have understood them to be different. *See* Razavi 103 (Section 4.2.1 on TDD and FDD), 105 (Section

4.2.2 on FDMA). Indeed, the Petition itself specifies that FDD relates to uplink and downlink (Pet. 30-31 (“FDD[] allows simultaneous transmission **and** reception”)) (emphasis added) (citing Razavi 103)), whereas FDMA simply relates to simultaneous “transmission” by multiple users in the uplink, or simultaneous “reception” by multiple users in the downlink. Haas Decl. ¶¶ 49-50. And in describing FDMA, Razavi gives examples that include “radio and television broadcasting, where the channel assignment does not change with time.” Razavi 105. Such broadcasting does not even include an uplink. Haas Decl. ¶ 52. Rather, the various users (e.g., radio stations) are assigned different frequencies in the radio band, allowing them to transmit simultaneously *within* the downlink. *Id.* Of course, consumers receive these signals simultaneously *within the downlink*. *Id.* But importantly, with FDMA (or “frequency multiplexing”) no transceiver is simultaneously transmitting and receiving. *Id.* There is no uplink operating simultaneously with a downlink. *Id.*

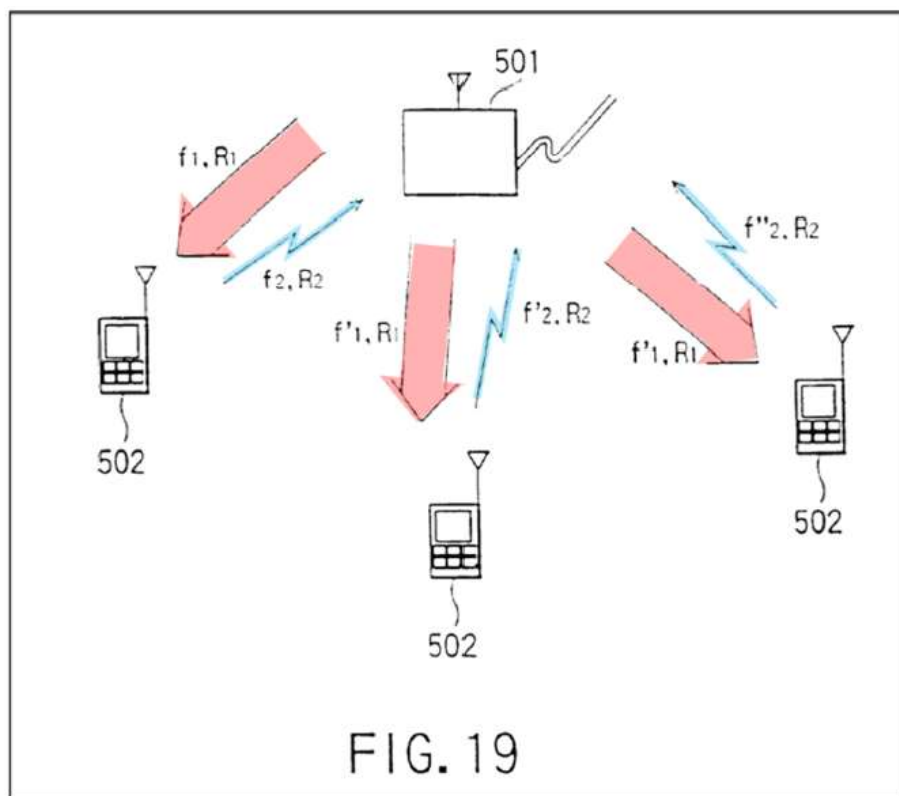
Petitioner has therefore failed to show that Serizawa's disclosure of frequency multiplexing means that its uplinks and downlinks operate at the same time.

2. Serizawa's Figure 3 and 19 do not disclose same time transmission and reception

Petitioner asserts that Figure 19 of Serizawa illustrates arrows indicating simultaneous uplink and downlink transmission and that Figure 3 “confirms” this

simultaneous operation through a separate transmitter and receiver for different bands. Pet. 46-47. From these figures, Petitioner asserts that “a POSITA would have understood that the separate receiver and transmitter units at each terminal allow for concurrent uplink and downlink transmissions over different frequency bands.” *Id.* 48 (citations omitted).

As it did with Morikawa in Ground I, Petitioner relies on arrows in a system diagram to infer simultaneous uplink and downlink operation. *Id.* 46. Petitioner's annotation of Figure 19 is reproduced below for convenience.

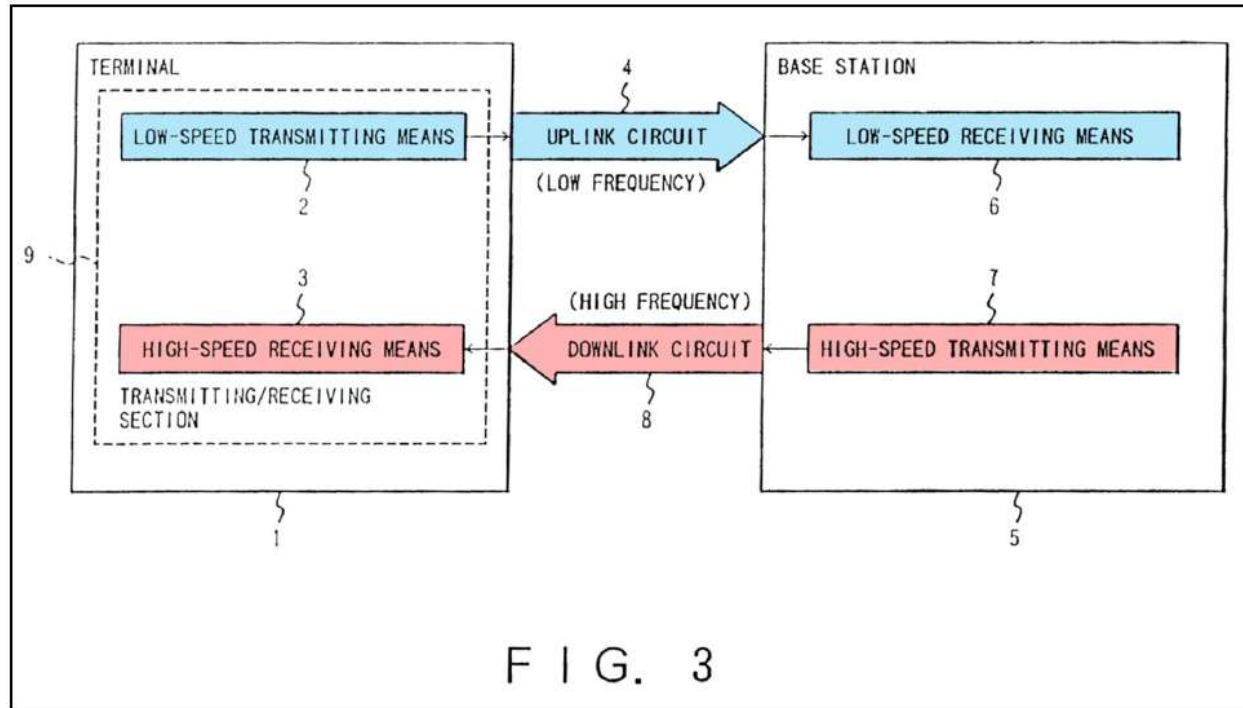


Serizawa, Figure 19 (as annotated at Petition page 47)

Figure 19 of Serizawa shows the uplinks and downlinks operating on different frequencies with different rates, but it does not teach or suggest their simultaneous operation especially when viewed in the context of Serizawa as a whole. Serizawa describes Figure 19 as “a conceptual drawing” (Serizawa 7:1) and never describes the uplink and downlink operating simultaneously (*id.* 19:47-20:13). To the contrary, Serizawa describes operation as being sequential, stating that “*f2 follows* and corresponds to *f1*,” where *f1* is the leftmost user’s downlink frequency and *f2* is the leftmost user’s uplink frequency. *Id.* 19:63-66. And as discussed above for Ground I, arrows on a figure do not teach or suggest simultaneous transmission, particularly where the specification makes no such disclosure. Haas Decl. ¶ 80.

Petitioner further cites Figure 3 (reproduced below), stating that “a POSITA would have understood that the separate receiver and transmitter units at each terminal allow for concurrent uplink and downlink transmissions over different frequency bands.” Pet. 48 (citing Ex. 1002, ¶ 144). Petitioner’s only evidence for this assertion about a POSITA’s understanding is Dr. Ding’s declaration. But again, Dr. Ding merely parrots the Petition without adding any evidence or explanation. Ex. 1002, ¶ 144 (“In my opinion, a POSITA would have understood that the separate receiver and transmitter units at each terminal allow for

concurrent uplink and downlink transmissions supporting two-way communications over different frequency bands.”).



Serizawa, Figure 3 (as annotated at Petition page 48)

Further, as explained above for Ground I, the use of separate radios does not teach or suggest simultaneous transmission. In fact, the Mangal reference used during prosecution contained separate radios for licensed and unlicensed transmission, as shown in Figure 1 of Mangal, reproduced below.

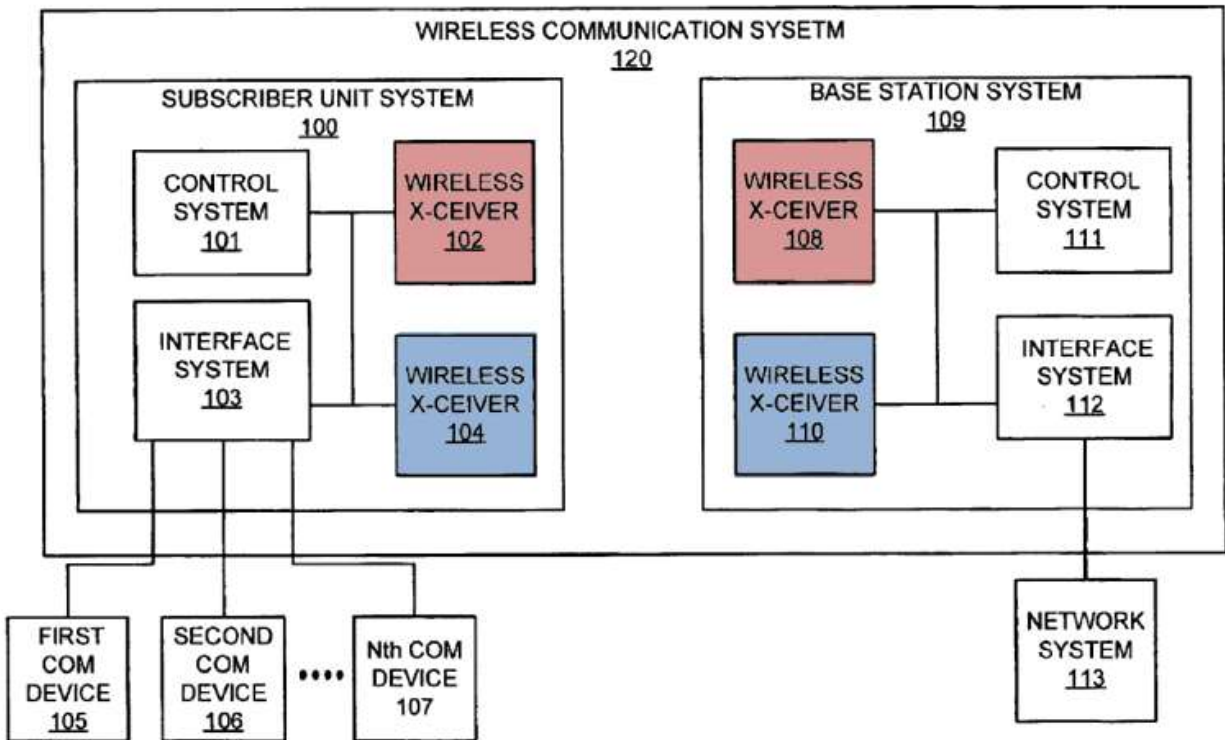


FIG.1

Haas Declaration ¶ 43 (annotating Mangal, Figure 1)

Just like Serizawa's Figure 3, Mangal's Figure 1 includes separate transceivers for the different bands. Within the subscriber unit system 100, wireless transceiver 102 is for the licensed transmission link, and wireless transceiver 104 is for the unlicensed transmission link. Mangal 7:37-41. Conversely, within base station system 109, wireless transceiver 108 is for the licensed transmission link and wireless transceiver 110 is for the unlicensed transmission link. *Id.*

Importantly, the '714 patent was allowed over Mangal after a successful appeal to the Board, which found that Mangal does not teach simultaneous transmission in

the uplink and downlink. '714 File History 454. The record simply does not support the use of separate radios teaching or suggesting simultaneous operation of those radios.

3. Petitioner's obviousness argument is legally insufficient.

Similar to its Ground I argument, Petitioner cites Figure 3 of Serizawa for its "separate receiver and transmitter units." Pet. 48. From this figure, Petitioner asserts that "a POSITA would have understood that the separate receiver and transmitter units at each terminal allow for concurrent uplink and downlink transmissions over different frequency bands." *Id.* (citing Ex. 1002, ¶ 144).

Even if Petitioner were correct in this assertion, its argument is legally insufficient. Just as it did in Ground I, Petitioner merely argues that Serizawa transceiver design "*allow[s]* for concurrent uplink and downlink transmissions." *Id.* (emphasis added). But the *mere possibility* of a feature is legally insufficient. *Personal Web Techs.*, 848 F.3d at 993-94 (conclusion that a combination "would have allowed for" a claimed limitation "is not enough: it does not imply a motivation to pick out those two references and combine them to arrive at the claimed invention") (emphasis omitted) (citing *Belden Inc.*, 805 F.3d at 1073) ("[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.") (original emphasis) (citation omitted).

Although the Petition contends that Dr. Ding “explains” this obviousness argument, his declaration simply parrots the conclusion: “In my opinion, a POSITA would have understood that the separate receiver and transmitter units at each terminal allow for concurrent uplink and downlink transmissions supporting two-way communication over different frequency bands.” Ex. 1002, ¶ 144.⁶

In paragraph 144, Dr. Ding adds three inconsequential words that differ from the Petition: “supporting two-way communication.” Ex. 1002, ¶ 144. These three words do nothing to explain or support Petitioner’s conclusory statement and provide no reason to give Dr. Ding’s identical conclusory statements any weight. The Board should not give Dr. Ding’s declaration any weight. *Xerox Corp.*, IPR2022-00624, Paper 9 at 15-16 (precedential) (expert testimony that is

⁶ Petitioner also cites to paragraph 37 of Dr. Ding’s declaration, which merely discusses the background of the ’714 patent and is silent as to a POSITA’s understanding or obviousness in relation to Serizawa. Petitioner’s reliance on the ’714 patent to support its obviousness conclusion shows classic hindsight bias. *In re NTP*, 654 F.3d at 1299 (“Care must be taken to avoid hindsight reconstruction by using the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.”) (internal quotation marks and citations omitted).

“conclusory and unsupported, [and] adds little to the conclusory assertion for which it is offered to support” is “entitled to little weight” especially when offered “to supply a limitation missing from the prior art”) (citations omitted).

* * *

Serizawa does not teach or suggest any simultaneous transmission and reception, let alone FDD specifically. Petitioner's attempts to fill in the gaps with Dr. Ding and the mere *possibility* of simultaneous operation fail to establish a reasonable likelihood of prevailing with Ground II against claims 1 and 13.

C. Independent Claims 31 and 32: Serizawa does not teach or suggest “wherein said transmitting and said receiving occur during the same communication session.”

Claims 31 and 32 are independent claims that recite “wherein said transmitting and said receiving occur during the same communication session.” ’714 Patent, cls. 31, 32. Petitioner relies on its flawed argument for claims 1 and 13 that “Serizawa teaches frequency multiplexing allowing transmission and reception of data to occur over different frequency bands during the same communication session.” Pet. 58, 59 (citation omitted). Petitioner is wrong for the same reasons discussed above for claims 1 and 13. Accordingly, Petitioner failed to establish a reasonable likelihood of prevailing against claims 31 and 32 in Ground II.

D. Dependent claims 2-5, and 14-17: Petitioner failed to demonstrate a reasonable likelihood of prevailing against any dependent claim in Ground II.

Dependent claims 2-5 depend from claim 1. As shown above, Petitioner failed to demonstrate a reasonable likelihood of prevailing against claim 1. For at least the same reasons, Petitioner failed to demonstrate a reasonable likelihood of prevailing against dependent claims 2-5.

Dependent claims 14-17 depend from claim 13. As shown above, Petitioner failed to demonstrate a reasonable likelihood of prevailing against claim 13. For at least the same reasons, Petitioner failed to demonstrate a reasonable likelihood of prevailing against dependent claims 14-17.

V. The Dependent Claims Are Not Obvious Over Serizawa in View of Razavi and/or Ferry (Ground III).

A. Dependent Claims 6-10 and 18-22

Dependent claims 6-10 depend from claim 1. As shown above for Ground II, Petitioner failed to demonstrate a reasonable likelihood that Serizawa renders claim 1 obvious. In Ground III, Petitioner does not attempt to cure Serizawa's deficiencies in relation to claim 1. For at least the same reasons, Petitioner failed to demonstrate a reasonable likelihood of prevailing against dependent claims 6-10.

Dependent claims 18-22 depend from claim 13. As shown above for Ground II, Petitioner failed to demonstrate a reasonable likelihood that Serizawa renders claim 13 obvious. In Ground III, Petitioner does not attempt to cure Serizawa's

deficiencies in relation to claim 13. For at least the same reasons, Petitioner failed to demonstrate a reasonable likelihood of prevailing against dependent claims 18-22.

B. Patent Owner has disclaimed claims 25-30.

On December 8, 2023, Patent Owner filed a statutory disclaimer with the U.S. Patent and Trademark Office disclaiming claims 25-30 of the '714 patent. *See* Ex. 2003 ('714 Patent Disclaimer). Accordingly, the Board need not address these claims when considering the Petition. 37 C.F.R. § 42.107(e).

VI. Conclusion

For the reasons set forth above, the Board should deny the Petition for Inter Partes Review.

Respectfully submitted,

Dated: December 13, 2023

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CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

I hereby certify that this Patent Owner's Preliminary Response complies with the word count limitation of 37 C.F.R. § 42.24(b)(1) because the Patent Owner's Preliminary Response contains 7,338 words using Microsoft Word's counting feature, excluding the cover page, signature block, and the parts of the Patent Owner's Preliminary Response exempted by 37 C.F.R. § 42.24(b)(1).

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 13th day of December, 2023, a true and correct copy of the foregoing **Patent Owner's Preliminary Response and all Exhibits** were served by electronic mail on Petitioner's lead and backup counsel at the following email addresses:

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