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Paper 31
Entered: February 3, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDIATEK INC. and MEDIATEK USA, INC.,
Petitioner,

v.

NIPPON TELEGRAPH AND TELEPHONE CORPORATION,
Patent Owner.

IPR2020-01404
Patent 7,280,551 B2

Before GREGG I. ANDERSON, CHARLES J. BOUDREAU, and NORMAN H. BEAMER, *Administrative Patent Judges.*

ANDERSON, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

MediaTek Inc. and MediaTek USA, Inc. (collectively "Petitioner") filed a Petition requesting *inter partes* review of claims 1–8 of U.S. Patent No. 7,280,551 (Ex. 1001, "the '551 patent"). Paper 2 ("Pet."). Nippon Telegraph and Telephone Corporation ("Patent Owner") filed a Preliminary Response. Paper 8 ("Prelim. Resp."). We instituted *inter partes* review on February 16, 2021. Paper 14 ("Inst. Dec."). Patent Owner filed a Response (Paper 19, "PO Resp."), Petitioner filed a Reply (Paper 22, "Reply"), and Patent Owner filed a Sur-Reply (Paper 23, "Sur-Reply). A hearing was held on November 18, 2021, and a transcript filed of record. Paper 30 ("Tr.").

We have jurisdiction under 35 U.S.C. § 314. Upon considering the record, for reasons discussed below, we find Petitioner has not demonstrated that claims 1–8 are unpatentable.

II. BACKGROUND

A. Real Parties in Interest

The real parties in interest for Petitioner are MediaTek Inc. and MediaTek USA, Inc. Pet. 3. The real parties in interest for Patent Owner are Nippon Telegraph and Telephone Corporation and Essential WiFi, LLC. Paper 4, 2.

B. Related Matters

Petitioner advises us that the '551 patent is the subject of two civil actions between Petitioner and Patent Owner in the Western District of Texas captioned *Nippon Telegraph & Telephone Corp. v. MediaTek, Inc.*, No. 1:20-cv-00632-ADA (W.D. Tex.) ("'632 Lawsuit"), and *Nippon Telegraph & Telephone Corp.* v. *MediaTek Inc.*, Civil Action No. 6:20-cv-00225 (W.D. Tex.) (collectively, "District Court" or "District Court Lawsuits"). Pet. 4. Petitioner identifies another four lawsuits where Patent

Owner is plaintiff that may be affected by the outcome of this proceeding. Pet. 3–4. Patent Owner identifies the '632 lawsuit above and two of the other four lawsuits listed by Petitioner. Paper 4, 2.[1]

C. The '551 Patent

The application for the '551 patent was filed September 9, 2004. Ex. 1001, code (22). The application for the '551 patent claims priority to Japanese application JP 2003-317100 filed September 9, 2003. *Id.* at code (30).[2]

1. Technology

In a conventional wireless packet communication apparatus, "a wireless channel[3] to be used is determined in advance." Ex. 1001, 1:23–25. Prior to transmission of a data packet, the wireless packet communication apparatus performs carrier sense[4] to detect whether or not that wireless channel is idle and, if it is idle, transmits one data packet. *Id.* at 1:26–31. "This management allows a plurality of stations (hereinafter STA) to share one wireless channel in a staggered manner . . . ." *Id.* at 1:29–32. "[A]

[1] In the Institution Decision, we also identified two other *inter partes* review proceedings between the same parties, *MediaTek Inc. and MediaTek USA, Inc. v. Nippon Telegraph & Telephone Corp.*, IPR2020-01555 and IPR2020-01607, involving different patents. We denied institution of *inter partes* review in IPR2020-01555 on March 4, 2021, and instituted *inter partes* review in IPR2020-01607 on April 2, 2021.

[2] Without conceding September 9, 2003, as the priority date, Petitioner identifies September 9, 2003, as the critical date. Pet. 17. Patent Owner does not argue that any of the references are not prior art. *See generally* PO Resp.

[3] A "channel is based on the center frequency of the carrier waves of the signals being transmitted over the channel." Ex. 1003 ¶ 34.

[4] Carrier sense multiple access with collision avoidance ("CSMA/CA") is a technique used to determine whether the channel is available. Ex. 1003 ¶ 35; *see also* Ex. 1001, 1:25–37 (citing IEEE 802.11-1999).

wireless packet communication method is known in which, when multiple wireless channels are found idle by carrier sense, a plurality of wireless packets are transmitted simultaneously by using the wireless channels." *Id.* at 1:43–47.

One problem in the prior art is power leakage from one wireless channel to another when center frequencies of multiple wireless channels used at the same time are close to each other. Ex. 1001, 2:26–34. Upon receipt of the packets at a receive-side station ("STA") an acknowledgment packet ("Ack" or "ACK") for the received wireless packet is returned to the transmit-side STA. *Id.* at 2:26–34. As a result of power leakage, the ACK may not be received. *Id.* at 2:46–48.

Another problem may arise when "[i]n a wireless LAN system, for example, data sizes of data frames input from a network are not constant." Ex. 1001, 2:52–53. As a result of differences in data packet sizes, packet transmission time lengths of the wireless packets are also different. *Id.* at 2:54–56. Therefore, even when a plurality of wireless packets are transmitted simultaneously, the transmission time of each wireless packet is different, increasing the possibility of unsuccessful receipt of the ACK packet. *Id.* at 2:57–60.

2. '551 Patent

The '551 patent describes and claims a wireless packet communication method and apparatus for transmitting a plurality of wireless packets simultaneously by using carrier sense to determine whether one of multiple wireless channels is idle. Ex, 1001, code (57). Using the multiple wireless channel and Multiple Input Multiple Output (MIMO), a mandatory channel is identified, set and always used for transmission. *Id.* at 1:19, 3:39–49. "In MIMO, different wireless packets are transmitted from a plurality of

antennas at the same time on the same wireless channel." *Id.* at 1:61–63. "[T]he mandatory channel can be regarded as a wireless channel having the highest priority among wireless channels that have a plurality of priorities." *Id.* at 3:58–60.

Figure 1 of the '551 patent is reproduced below.

FIG. 1

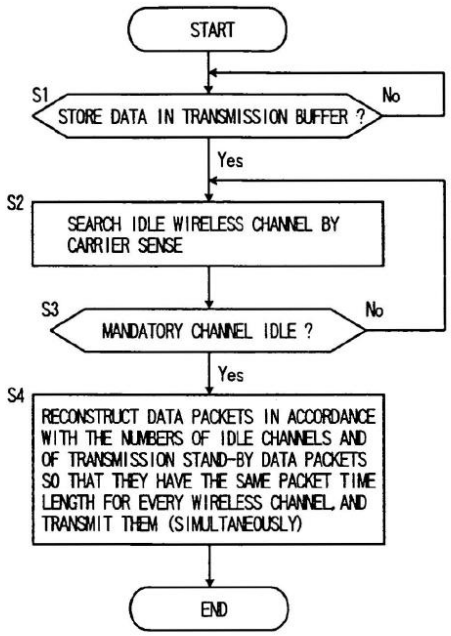

Figure 1 is a flowchart according to one embodiment of the invention.

Ex. 1001, 5:4–5, 5:48–50. Referring to Figure 1, at step S1 data is stored in a buffer, and at S2 the station uses conventional "carrier sense" technology to search for idle channels. *Id.* at 5:62–66. At S3 the station determines if the mandatory channel is idle. *Id.* at 5:56–57. If the mandatory channel is busy the search for an idle channel is repeated as per the flow chart. *Id.* at 5:67–6:2. If the mandatory channel is idle, at S4 data packets are reconstructed to "data packets having the same packet time length for every wireless channel in accordance with the number of idle channels and the number of transmission stand-by data packets." *Id.* at 6:2–7.

D. Illustrative Claim

All claims of the '551 patent, 1 through 8, are challenged. Pet. 5. Claims 1 and 2 are independent method claims and claims 5 and 6 are independent apparatus claims. The remaining claims 2–4 and 7 all depend from one or more of the independent claims. All claims are directed to "wireless packet communication." Ex. 1001, 12:13–14:15. Claim 1 is reproduced below as illustrative.

> [1PRE][5] A wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO, the method comprising:
>
> [1A] setting a mandatory channel that is always used for transmission; and
>
> [1B] transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle.

Ex. 1001, 12:13–25.

E. Evidence

This proceeding relies on the following prior art references:

Shpak (Ex. 1005): Shpak, US 2003/0206532 A1, filed Aug. 7, 2002, published Nov. 6, 2003;

Ho (Ex. 1006): Ho et al., US 2003/0169769 A1, published Sep. 11, 2003;

[5] The bracketed labels of each claim limitation are used by Petitioner and Patent Owner, and we adopt them for purposes of this Decision. *See*, *e.g.*, Pet. 15–16; PO. Resp. 41, 45, 49, 52, 55, 59, 61.

Lundby (Ex. 1008): Lundby et al., US 6,560,292 B1, issued May 6, 2003;

Bugeja (Ex. 1007): Bugeja, US 2003/0220112 A1, published Nov. 27, 2003; and

Thielecke (Ex. 1035): Thielecke et al., US 2003/0003863 A1, published Jan. 2, 2003.

Petitioner also relies on the Declaration of Tim A. Williams, Ph.D. ("Williams Declaration," Ex. 1003) and his Reply Declaration ("Williams Reply Declaration," Ex. 1062). Patent Owner also relies on the Declaration of James T. Geier in Support of Patent Owner's Response to Petition for *Inter Partes* Review of U.S. Patent No. 7,280,551 ("Geier Declaration," Ex. 2005).

F. Asserted Grounds

Petitioner asserts that claims 1–8 would have been obvious on the following grounds (Pet. 5, 18–74):

Claim(s) Challenged	35 U.S.C. §[6]	Reference(s)/Basis
1, 3–5, 7, 8[7]	103	Shpak, Lundby
1, 3, 5, 7	103	Shpak, Ho
1–3, 5–7	103	Bugeja, Ho
4, 8	103	Shpak, Ho, Thielecke
4, 8	103	Bugeja, Ho, Thielecke

[6] The Leahy-Smith America Invents Act (AIA), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), which revised 35 U.S.C. §§ 102 and 103, became effective March 16, 2013. The '551 patent has a filing date of September 9, 2004 (*see* Section II.C), prior to the effective date of the AIA. Thus, we analyze the grounds asserted under the pre-AIA version of 35 U.S.C. § 103.

[7] Page 5 of the Petition lists the challenged claims under Shpak and Lundby as 1, 3, 5, and 7. However, the Petition later goes on to allege that claims 4 and 8 would have been obvious over the combination of Shpak and Lundby. Pet. 49–51.

III. ANALYSIS

A. Legal Standard for Obviousness

A patent claim is invalid as obvious if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a).

> The ultimate determination of obviousness is a question of law, but that determination is based on underlying factual findings. . . . The underlying factual findings include (1) "the scope and content of the prior art," (2) "differences between the prior art and the claims at issue," (3) "the level of ordinary skill in the pertinent art," and (4) the presence of secondary considerations of nonobviousness such "as commercial success, long felt but unsolved needs, failure of others," and unexpected results.

In re Nuvasive, Inc., 842 F.3d 1376, 1381 (Fed. Cir. 2016) (citing *inter alia Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966)).

"To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Furthermore, in assessing the prior art, the Board must consider whether a person of ordinary skill would have been motivated to combine the prior art to achieve the claimed invention. *Nuvasive*, 842 F.3d at 1381.

As the Supreme Court has held,

> because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known, . . . it can be important to identify 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.

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 418–19 (2007).

B. Level of Ordinary Skill in the Art

Petitioner alleges a person having ordinary skill in the art "would have had at least a B.S. in Electrical Engineering, or the equivalent, and 3–4 years of experience designing wireless packet communication devices, including 802.11-compliant devices. More education could substitute for less experience, and vice versa." Pet. 17–18 (citing Ex. 1003 ¶¶ 27–31). Patent Owner accepted Petitioner's proposal in its Preliminary Response but does not take a position in its Response. *See* Paper 8, 4 fn.3. On this record, we adopt Petitioner's proposal, which is consistent with the prior art of record.

C. Claim Construction

In an *inter partes* review based on a petition filed on or after November 13, 2018, a claim "shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b) (2019); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc) (citation omitted). The following terms are either in dispute and/or have been previously construed in the Institution Decision and are included for completeness of the record.

1. "mandatory channel"

In the Institution Decision we construed "mandatory channel" as meaning "one channel in a wireless multichannel communication system over which transmission must occur before transmission over the other wireless channels." Inst. Dec. 21. Patent Owner argues the construction should be modified by substituting "whose idle state determines whether there can be a transmission" for "over which transmission must occur before transmission." PO Resp. 1 n.1, 11–12. Patent Owner otherwise agrees with the preliminary construction. *Id.* at 1–2.

We modify our preliminary construction of "mandatory channel" and adopt Patent Owner's proposed construction of "mandatory channel." We respond to Petitioner's arguments against adoption of Patent Owner's construction below. We therefore determine that "mandatory channel" means "one channel in a wireless multichannel communication system whose idle state determines whether there can be a transmission over the other wireless channels."

a. District Court construction of "mandatory channel"

In the '632 Lawsuit, the District Court issued a Claim Construction Order on February 4, 2021, holding that "'mandatory channel' has a 'plain-and-ordinary meaning,' and clarified that the mandatory channel 'may be the only channel and wherein its busy/idle state determines whether there is a transmission regardless of idle state of other channels (if any).'" *See* Reply 19 (citing Ex. 1055, 4). Petitioner argues we should adopt the District Court construction because adoption promotes consistency and reduces the potential for inconsistent results. *See id.* ("The Board should adopt the Court's construction of 'mandatory channel' for those same reasons and

because ***it is correct***.”). As discussed below, we have given the District Court construction the appropriate weight but do not adopt it.

In an appeal under our prior “broadest reasonable interpretation” construction standard, our reviewing court held “[t]here is no dispute that the board is not generally bound by a prior judicial construction of a claim term.” *Power Integrations, Inc. v. Lee*, 797 F.3d 1318, 1326 (Fed. Cir. 2015) (citing *In re Trans Tex. Holdings Corp.*, 498 F.3d 1290, 1298 (Fed. Cir. 2007). *Power Integrations* held that “the board had an obligation, in these circumstances, to evaluate [the district court] construction and to determine whether it was consistent” with the Board’s construction under the broadest reasonable interpretation standard. *Power Integrations*, 797 F.3d at 1327.

In considering the “appropriate weight” to give a prior construction we look at “the similarities between the record in the district court or the ITC and the record before the Board”; “whether the prior claim construction is final or interlocutory”; “whether the terms construed by the district court or ITC are necessary to deciding the issues before it”; and “the facts and circumstances of each case.” Patent Trial and Appeal Board Consolidated Trial Practice Guide at 47 (Nov. 2019), https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf. The briefing of the parties in the District Court suggests the evidence was substantially the same as here. *See, e.g.*, Ex. 1056,[8] 14–17 (citing Shpak (Ex. 1005 here); Geier Declaration (Ex. 2005 here); Ex. 1058[9]). The District Court’s Claim Construction Order states the construction is “final.” *See* Ex. 1055, 1 (“final construction”). Trial was set

[8] ’632 Lawsuit, Plaintiffs’ Opening Claim Construction Brief, Dkt. 37.
[9] ’632 Lawsuit, Transcript of *Markman* Hearing, February 4, 2021.

for January 10, 2022, but the case was reassigned and an Order Resetting Schedule entered January 12, 2022, setting a pretrial for May 19, 2022, and a jury trial for June 13, 2022. '632 Lawsuit, ECF No. 89; *see also* Inst. Dec. 42 (ordering the parties to advise us of "the setting of a trial date"). The construction could change as the record is further developed at trial. As to the necessity for construction, the District Court did construe "mandatory channel."

We disagree with Petitioner that the District Court "explicitly rejected [Patent Owner's] contention that 'mandatory channel' limits the claims to multichannel systems." Reply 19 (citing Ex. 1056, 14–17; Ex. 1057,[10] 7–9; Ex. 1058, 21:3–30:24); *see* Section III.C.1.c below. Petitioner argues the District Court construction is inconsistent with our preliminary construction. *Id*. at 19–20 (citing Inst. Dec. 21 ("Further, the '*mandatory channel*' *may be the only channel* used and still be within the scope of the claims."); Ex. 1055, 4 ("The Court found '*mandatory channel*' *may be the only channel* . . . ."). As shown in the italicized language above from each construction, we are not persuaded there is an inconsistency.

Petitioner argues a single channel system falls within the scope of "mandatory channel" because the District Court finds "'mandatory channel' has a 'plain-and-ordinary' meaning," and clarified it 'may be the ***only channel*** and wherein its busy/idle state determines whether there is a transmission regardless of idle state of other channels (***if any***).'" Reply 19 (citing Ex. 1055, 4). Stated another way, we understand Petitioner argues that the District Court construction contemplates a single mandatory channel

[10] '632 Lawsuit, Plaintiffs' Reply in Support of Their Opening Claim Construction Brief, Dkt. 48.

and "other channels" may or may not be present because of the "if any" parenthetical qualifier.

We are not persuaded that the parenthetical limits the construction of "mandatory channel" to a single channel. Regardless, the problem addressed by the '551 patent is power leakage across multiple wireless channels. Ex. 1001, 2:26–30. We also agree with Patent Owner that in "***every*** embodiment, a 'mandatory channel' is identified from ***one of multiple*** available channels provided between a transmitting and receiving station (STA)." PO Resp. 14–15 (citing Ex. 1001, 5:52–57, 7:8–12); *see also* Sections III.C.1.c and III.C.3 below (discussion regarding "single wireless channel" and "multiple wireless channels" respectively).

b. "busy/idle" state of "mandatory channel"

We find that our preliminary construction, Patent Owner's newly proposed construction,[11] and the District Court construction are all but the same as to whether transmission occurs in other channels based on the "busy/idle" state of the "mandatory channel." *E.g.*, *compare* Ex. 1055, 4, *with* Inst. Dec. 21; PO Resp. 1 n.1. Claim 1 recites expressly that transmission of packets occurs "only when the mandatory channel is idle." Ex. 1001, 12:24–25. We agree with the District Court, and Petitioner does not dispute, that transmission over other channels depends on the "busy/idle" state of the "mandatory channel." Ex. 1055, 4. Petitioner *does dispute* that part of our preliminary construction and Patent Owner's proposed

[11] In the Preliminary Response, Patent Owner proposed that "mandatory channel" is "one of several frequency channels provided between two STAs, whose busy/idle state determines whether there is transmission regardless of idle state of the other available channels." Paper 8, 16. Patent Owner's new construction is set forth in Section III.C.1 above.

construction "that 'mandatory channel' limits the claims to multichannel systems." Reply 19–24; *see* Section III.C.3 below.

As to the "busy/idle" state of the mandatory channel, claim 1 specifically recites transmission on the other channels occurs "only when the mandatory channel is idle." We agree with the District Court and Patent Owner regarding the mandatory channel's "idle" state as a necessary part of the construction of "mandatory channel." PO Resp. 11–12, 16–19 (arguing the idle state determines whether transmission occurs over the other wireless channels) (citing Ex. 2005 ¶ 74).

c. "single wireless channel"

In the Institution Decision we preliminarily found the preamble is limiting. Inst. Dec. 19. Neither party argues the preamble is not limiting, and for purposes of this Decision we maintain our finding that the preamble is limiting. [12]

Petitioner argues the preamble of claim 1 has three alternative communication methods listed in the disjunctive and that showing any one of the three supports unpatentability. Pet. 28. For certain challenges, Petitioner relies on the alternative that recites "a single wireless channel determined to be idle and MIMO," which it argues requires using a single channel. *Id*. at 27 (citing Ex. 1003 ¶ 88); Reply 20–21 (citing Ex. 1062 ¶¶ 13–14). The other two options recite, in pertinent part, "multiple wireless channels." Ex. 1001, 12:14–17. Petitioner finds support for limiting its selected option to a single wireless channel in the prosecution of the European application, which is identical to the '551 patent specification and

[12] Independent claims 5 and 6 have the same preamble as claim 1. Unless otherwise stated, we analyze claim 1 as representative.

also includes the same claim 1. Reply 29 (citing Ex. 1059[13], 98–100 (claims including identical claim 1)). Petitioner argues Patent Owner admitted in the European prosecution that "the claims cover a single MIMO-implemented channel and that when this single channel is the 'only one' it 'is defined as the mandatory channel.'" *Id*. at 30 (citing Ex. 1059, 130; *Caterpillar Tractor v. Barco, S.P.A.*, 714 F.2d 1110, 1116 (Fed. Cir. 1983); *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1312–13 (Fed. Cir. 2014) (holding a patentee "to the statements made during [foreign] prosecution" where, as here, the two patents "are related and share a familial relationship")).

Patent Owner argues that the single wireless channel preamble option Petitioner relies on is not limited to a single channel because it is "possible to use other idle channels." PO Resp. 12–13 (citing Ex. 2005 ¶¶ 50, 65–67; Ex. 1001, 12:13–25 (claim 1), 1:24–26). Patent Owner also argues "to the extent the [District] Court's construction contemplates that the 'mandatory channel' 'may be the only channel,' this is consistent with the case wherein only a single channel is ***used***." *Id*. at 12 (citing Ex. 1001, 12:13–25 (claim 1)). Patent Owner argues that the recitation of "a wireless channel/wireless channels ***that includes/include*** the mandatory channel, ***only*** when the mandatory channel is idle" requires other channels are available for use. *Id*. at 11–12 (citing Ex. 1001, 12:13–25 (claim 1); Ex. 2005 ¶ 62) (emphasis added).

Patent Owner argues,

> [T]hat MIMO only requires use of a single frequency channel ***does not*** mean the '551 [patent] relates to single-channel systems. Similarly, the statements that Petitioner cites in the

[13] European Application No. 04 773 142.7-2414 (PCT/JP2004/013483).

> prosecution of a related European application (to the extent relevant)[] only emphasize the ***use*** of one channel, not that only one channel was provided at the outset.

Sur-Reply 17 (citing Ex. 1059, 130 ("packets 'can be transmitted . . . ***using*** a single wireless channel'")). Further, Patent Owner argues that under *Caterpillar* and *Apple* statements made in foreign prosecution that are unique to foreign law are irrelevant to patentability under the laws of the United States. *Id*. at 22 (citing *Pfizer, Inc. v. Ranbaxy Labs. Ltd.*, 457 F.3d 1284, 1290 (Fed. Cir. 2006)).

We agree with Patent Owner and find that in "every embodiment, a 'mandatory channel' is identified from one of multiple available channels provided between a transmitting and receiving station (STA)." PO Resp. 14–15 (citing Ex. 1001, 5:52–57, 7:8–12). The Specification describes a "mandatory channel" in several embodiments, all of which identify the "mandatory channel" as one of multiple available channels provided between a transmitting and receiving station. *E.g.*, Ex. 1001, 5:48–6:42 (describing the first embodiment). Every embodiment of the '551 patent describes the "mandatory channel" as one of multiple available channels. *See* PO Resp. 14 (citing Ex. 1001, 5:52–57).

We find that the options are connected by "or" and are recited in the alternative. *See* Ex. 1001, 12:14–18. Therefore, the claimed invention is shown when any one of the three recited "wireless packet communication" methods is shown in the art. However, we are not persuaded that the preamble option selected by Petitioner is limited to a "single" transmission channel because we find MIMO is not so limited. *See* Pet. 27 (citing Ex. 1003 ¶ 88); Reply 20–21 (citing Ex. 1062 ¶¶ 13–14). Support for this finding includes Dr. Williams' testimony that the "single wireless channel"

preamble option would be understood as "'***simultaneous*** transmissions' over a single ***MIMO***-implemented wireless channel." Ex. 1062 ¶ 25.[14]

We find that MIMO as used in the claims and understood by a person of ordinary skill in the art includes multichannel systems. As Dr. Williams testifies, MIMO contemplates "different wireless packets [being] transmitted from a plurality of antennas at the same time on the same wireless channel." Ex. 1003 ¶ 39 (quoting Ex. 1001, 1:61–63; Ex. 1019[15] ¶ 66 ("The transmitter may send multiple independent data streams on a same carrier frequency to a given user.")). Dr. Williams describes how each MIMO channel may have its capacity "increased by creating multiple, independent 'sub-channels' within the overall channel, which might be referred to as a 'MIMO channel' when used for MIMO transmissions." *Id*.

Petitioner acknowledges "[t]he parties do not dispute the meaning of 'channel.'" Reply 20. Dr. Williams explains the number of sub-channels is the same number as the number of transmitting and receiving antennas.[16] Ex. 1003 ¶ 40. Sub-channels are not argued as somehow differing in function from channels. *See id*. (the meaning of "channel" is not disputed). We find that a MIMO channel, e.g., the claimed "mandatory channel," and

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[14] Petitioner argues the Institution Decision was wrong in citing Ho to find MIMO requires at least two channels. Reply 21 (citing Inst. Dec. 20 (citing Ex. 1006 ¶¶ 9–10)). Petitioner argues that Ho "indisputably discloses MIMO over a ***single channel.***" Reply 21 (citations omitted). We do not analyze this contention further because our reference to what Ho teaches was a preliminary finding in the Institution Decision and has never been relied on by Patent Owner. Instead of looking at Ho, a reference incorporating MIMO, we analyze MIMO directly.

[15] Wallace, US 2002/0193146 A1, published Dec. 19, 2002.

[16] If the number of antennas differs at the transmitting and receiving sides, then MIMO sets the number of subchannels to the lower number of antennas. *Id*.

MIMO sub-channels comprise a wireless "multichannel communication system." MIMO is contrasted with single input, single output ("SISO"), a "single transmit system." *Id.* ¶ 39; *see also* Ex. 1006 ¶ 9 (SISO is slower than MIMO).

The claim language supports our construction regarding a single channel. Only one channel can be the "mandatory channel" that is the only channel used for transmission. Ex. 1001, 12:19–21; *see also* Reply 20 (citing Ex. 1059, 130 (the "claims ***already define*** the mandatory channel by stating that it is a channel '*that is always used for transmission*.'" (italics in original))). We disagree with Petitioner that nothing in the claim language "limits 'mandatory channel' to one of several channels." *See* Reply 20.

Claim 1 recites "setting a mandatory channel," the plain meaning of which indicates one channel is selected from multiple available channels. *See* PO Resp. 12–13; Sur-Reply 15. We find that "[i]f it were not possible to use other idle channels, there would be no meaning to the step limiting transmission on 'a wireless channel/wireless channels ***that includes/include*** the mandatory channel, ***only*** when the mandatory channel is idle.'" PO Resp. 12 (citing Ex. 1001, 12:13–25 (claim 1); Ex. 2005 ¶ 65).

The Specification supports this conclusion. *See* Ex. 1001, 3:56–57 ("[W]hen the mandatory channel is busy, each STA does not perform transmission even if there is other idle wireless channel."); 12:22–25 (claim 1) (reciting "transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, *only when the mandatory channel is idle*"). The "mandatory channel" would be unnecessary in the context of one transmission over a single-channel or single transmit system, like SIMO or SISO. *See* PO Resp. 12 (citing Ex.

2005 ¶ 65; Ex. 1001, 12:13–25 (claim 1)); Ex. 1003 ¶ 39 (comparing MIMO to SIMO and SISO).

We also find support for our conclusion in Patent Owner's argument that "[a]lthough it was known that this single channel is one of 14 possible channels that may be defined in the 2.4 GHz band, the '551 Patent ***does not*** describe this process as '**setting** a mandatory channel.'" PO Resp. 12–13 (citing Ex. 2005 ¶¶ 50, 66). The '551 patent explains that "when the mandatory channel is idle, data packets are reconstructed to data packets having the same packet time length *for every wireless channel* in accordance with the number of idle channels and the number of transmission stand-by data packets." Ex. 1001, 6:3–8 (emphasis added). In other words, "transmitting a plurality of packets" depends on both the number of packets and the number of available wireless channels, whether or not in use.

The Specification states the purpose of the '551 patent as transmitting "wireless packets only 'via wireless channels including the mandatory channel, and when the mandatory channel is busy, transmission is not performed even if there is another wireless channel'" available so as to avoid leakage between channels. *See* PO Resp. 1 (quoting Inst. Dec. 19 (citing Ex. 1001, 3:53–57, 2:26–30, 5:58–61), 6–11).

The Specification teaches that the problem of power leakage arises when "in [the] case of transferring a wireless packet, a transmit-side STA transmits the wireless packet and thereafter a receive-side STA transmits an acknowledgment packet (Ack) for the received wireless packet to the transmit-side STA," while "another wireless channel [is] used for simultaneous transmission." Ex. 1001, 2:30–37. Avoiding "leakage" over adjacent channels in multichannel systems is also a stated object of the '551 patent. PO Resp. 6 (citing Ex. 1001, 3:33–35; Ex. 2005 ¶ 57). Thus,

leakage can affect the channels associated with the "mandatory channel." *Id*. at 8 (citing Ex. 1001, 5:57–61). Patent Owner points out that claim 1 limits transmission "when the mandatory channel" is idle, even if other channels may be available. *Id*. (citing Ex. 1001, 12:13–25 (claim 1)). Based on the preceding, we find that setting a "mandatory channel" in a multichannel system prevents transmission when power leakage is expected to be a problem. *Id*. at 10 (citing Ex. 2005 ¶ 61 (citing Ex. 1001, 11:67–12:6)).

On this record, we determine that construing the claimed invention to cover only a "single wireless channel" would be contrary to the purpose of the invention, which is to prevent leakage between multiple channels. "A patent's statement of the described invention's purpose informs the proper construction of claim terms . . . ." *Kaken Pharm. Co. v. Iancu*, 952 F.3d 1346, 1352 (Fed. Cir. 2020); *see also* Sur-Reply 4 (citing *Netcraft Corp. v. eBay, Inc.*, 549 F.3d 1394, 1396–97 (Fed. Cir. 2008) (explaining that a person of ordinary skill in the art is "deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification").

2. "transmitting a plurality of wireless packets simultaneously"

As we determined in the Institution Decision, the papers filed did not raise any dispute as to whether the references relied upon teach the "transmitting" term. Inst. Dec. 21–22. Neither party indicates any change of circumstances. There appearing to be no dispute that would be resolved by construction of the "transmitting" term, we proceed on the plain and ordinary meaning of the term without express construction. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)

("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

3. "multiple wireless channels"/"wireless channels"

At the institution stage, the "wireless channels" terms were determined not to be in dispute. Inst. Dec. 22. With the exception of the"single wireless channel" discussed above, "multiple wireless channels"/"wireless channels" appear in the other two preamble options as well as in the body of the claims. *See* Ex. 1001, 12:13–18, 12:22–23. Neither party indicates any change of circumstances, nor is any argument presented. There appearing to be no dispute that would be resolved by construction of the "multiple wireless channels" or "wireless channels" terms, we proceed on the plain and ordinary meaning of the terms without express construction. *See Vivid Techs., Inc.*, 200 F.3d at 803.

D. Obviousness of Claims 1, 3–5, 7, and 8 over Shpak and Lundby[17]

Petitioner alleges claims 1, 3–5, 7, and 8 would have been obvious over Shpak and Lundby. Pet. 39–51. Petitioner also relies on the Williams Declaration. Ex. 1003 ¶¶ 119–159.

1. Shpak (Ex. 1005)

Shpak discloses "arranging a plurality of access points in a wireless local area network ("WLAN") to communicate on a common frequency channel with a mobile station." Ex. 1005, code (57). Shpak relates generally to the IEEE 802.11 standard regarding WLANs, which in the United States are limited to three available channels. *Id.* ¶ 6, code (57). Figure 2 of Shpak is reproduced below.

[17] This was the first ground argued by the parties after institution. *See* PO Resp. 19–49; Reply 1–14. We therefore start with this ground.

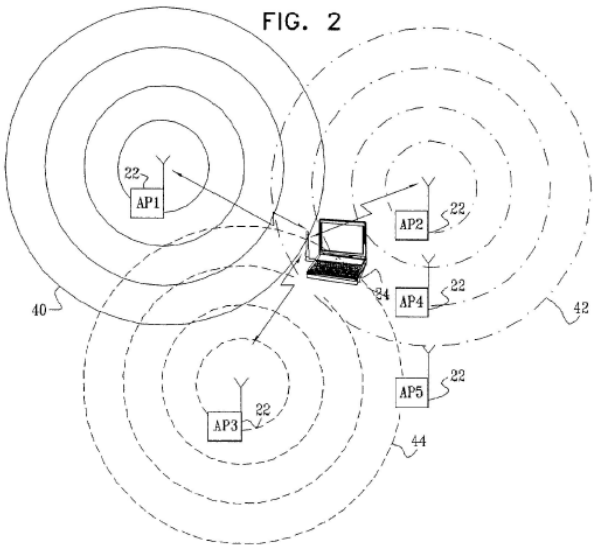

Figure 2 is a schematic illustration of a mobile station communicating with multiple wireless access points, in accordance with a preferred embodiment of the present invention.

Id. ¶ 28. Referring to Figure 2, access points ("AP1–AP5") 22 all operate "on the same band" (e.g., 802.11's 2.4 GHz band) "over which mobile station 24 seeks to communicate." *Id.* ¶ 36. To establish communication with the mobile station on this "common frequency channel," the APs first "transmit beacon signals on their common frequency channel." *Id.* ¶ 37, Fig. 3 (step 50). When a mobile station receives a beacon signal, it extracts information from the signal and uses that information to send an uplink signal to the APs containing an association request message. *Id.* ¶ 38, Fig. 3 (steps 52, 54).

Upon receiving the mobile station's uplink signal, the APs arbitrate amongst themselves to determine which one should respond to the station's association request. Ex. 1005 ¶¶ 39–42, Fig. 3 (steps 56, 58). The "winning access point" answers the association request with an acknowledgement and

subsequently sends an association response message to the mobile station. *Id.* ¶ 43, Fig. 3 (step 60). The winning AP then continues "its downlink transmission to the mobile station as appropriate." *Id.* ¶ 43, Fig. 3 (step 62). Data is transmitted from the winning AP to the station only over the common frequency channel. *Id.* ¶¶ 22, 24, claim 1. Shpak's APs are coupled together, preferably by a hard-wired network, and "communicate among themselves using a novel protocol." *Id.* ¶¶ 8–9.

Communication between the mobile station and the winning AP occurs in accordance with then-existing 802.11 standards. Ex. 1005 ¶¶ 3, 16, 33, 38 (method "requires no modification of legacy mobile stations"), 39 ("maintain 802.11 compatibility"), 46, claim 3. Shpak explains that 802.11 standards utilize "a mechanism for collision avoidance known as clear channel assessment (CCA), which requires a station to refrain from transmitting when it senses other transmissions on its frequency channel." *Id.* ¶ 5.

2. Lundby (Ex. 1008)

Lundby discloses a method for "improving the transmission of information signals in a communication system having a base station and a remote station" having first and second transmission links between the two. Ex. 1008, code (57). Figure 2 of Lundby is reproduced below.

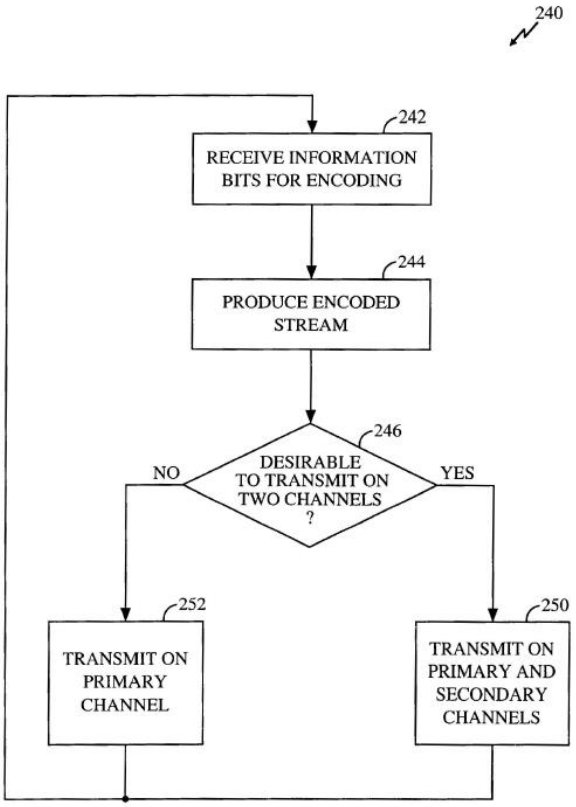

FIG. 2

Figure 2 shows a block diagram representation of a method for transmitting information in a wireless communications system.

Id. at 3:26–29. Lundby's process begins when the base station has an "information bit stream to be transmitted to a remote station." *Id.* at 3:51–53. Referring to Figure 2 above, at block 246, "it is determined whether a single standard rate encoded bit stream should be transmitted on a single channel or whether a lower rate encoded bit stream should be transmitted in portions over two channels." *Id.* at 4:26–30. This decision can be based on "[a]ny parameter(s)," which "can be used to optimize the communication system in some way." *Id.* at 4:30–52. Lundby's teaching applies to any "embodiment[] that can determine whether transmitting data to a particular

remote station across two channels will optimize the communication system." *Id.* at 5:49–53.

If "the communication system will benefit from transmitting data to a particular remote station across two channels," different portions of the bit stream are transmitted across the primary and secondary channels, where those portions can be "of equal" or "varying length." Ex. 1008, 6:5–8, 6:22–27. As shown in Figure 2, "[i]f, in block 246, it is determined that the communication system will benefit from transmitting data to a particular remote station across two channels, the process proceeds to block 250." *Id.* at 6:5–8. If the system would not benefit from using two channels for a particular transmission, "the process proceeds to block 252," to be "transmitted on a primary channel" only. *Id.* at 6:8–12. Lundby's "secondary channel can be established when needed or it can already be in use"; for example, the secondary channel allows for "a higher gain in the communication system." *Id.* at 6:30–34.

3. Claim 1

Claim 1 is an independent method claim illustrative of the claimed subject matter. *See* Section II.D above.

a. Petitioner's Argument and Evidence

Petitioner's position on the Shpak and Lundby combination was summarized at oral argument. Shpak teaches claim 1's alternative of a single channel, i.e., the "common frequency channel without MIMO." Tr. 12:23–13:12. Lundby is relied on to teach additional channels. *Id.* A person of ordinary skill would have added the additional channels of Lundby to Shpak's single channel to achieve more bandwidth in the combined system. *Id.* The showing made in the Petition follows.

The option from the preamble of claim 1 [1PRE] upon which Petitioner relies recites, in pertinent part, "[a] wireless packet communication method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense." Pet. 45 (citing Pet. 27 (preamble option [1])). As noted above, we find the preamble is limiting.

Regarding the recitation of "multiple wireless channels," Petitioner cites Shpak's APs for "transmit[ting] wireless packets using one of the available 802.11b channels as a 'common frequency channel.'" Pet. 45 (citing Ex. 1003 ¶ 138). Petitioner argues Shpak's APs would have transmitted using multiple channels as taught by the primary and secondary channels of Lundby "when desirable," using the "common frequency channel" as a primary channel and another available 802.11b channel as a secondary channel." *Id*. (citing Pet. 41–44 (citing Ex. 1008, code (57), 4:25–43, Fig. 2; 1005 ¶¶ 6, 11, 22, 37, 51, claims 1 and 13; Ex. 1003 ¶ 124))).

The second part of the preamble option [1] recites that a channel is "determined to be idle by carrier sense." Petitioner argues Shpak's APs are "802.11-compliant and thus determine[] the channels to be idle before transmitting, using the 802.11 standard's 'clear channel assessment (CCA)' to implement the CSMA/CA channel access protocol." Pet. 45 (citing Ex. 1005 ¶ 5; Ex. 1003 ¶ 138 (citing Ex. 1037,[18] 2:47–3:7; Ex. 1044,[19] 2:47–3:7; Ex. 1002,[20] 136)).

[18] Hoeben, U.S. Pat. No. 7,321,762 B2, issued Jan. 22, 2008.
[19] Gubbi, U.S. Pat. No. 7,092,374 B1, issued Aug. 15, 2006.
[20] Prosecution History, US Pat. No. 7,280,551 B2.

Limitation [1A] recites "setting a mandatory channel that is always used for transmission." Petitioner alleges the limitation is met and that Shpak's "common frequency channel" is the "primary channel" in the combination with Lundby. Pet. 46 (citing Ex. 1003 ¶ 140). Petitioner further alleges "[t]he primary channel is selected from the available 802.11b channels and is thus 'set' as 'a mandatory channel that is always used for transmission.'" *Id.* Petitioner cites the decision tree shown in Figure 2 of Lundby "to select which channel(s) to use," the primary channel or both the primary and secondary channels. *Id.* (citing Ex. 1003 ¶ 140).

For that part of limitation [1A] requiring that the "mandatory channel is always used for transmission," Petitioner argues "Lundby does not disclose using only the secondary channel" and thus "the primary channel is always used for transmission." Pet. 46 (emphases omitted) (citing Ex. 1003 ¶ 140). Petitioner alleges the "secondary" or "supplemental channel" is used "to augment the primary channel's bandwidth [with the secondary channel] such that wireless packets are transmitted on both channels simultaneously." Reply 2 (citing Pet. 41–42). Petitioner argues specifically "the secondary channel is reserved for bandwidth augmentation." Reply 5 (citing Pet. 42; Ex. 1003 ¶ 126; Ex. 1062 ¶¶ 61–63).

Limitation [1B] recites "transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle." Petitioner argues "Shpak-Lundby's AP would have always sent packet transmissions using the primary (mandatory) channel, alone or in combination with Shpak-Lundby's secondary channel." Pet. 47 (citing Ex. 1003 ¶ 141). Petitioner concludes that in following Lundby's decision tree of Figure 2, if the "primary (mandatory) channel was not idle, Shpak-Lundby's AP would not transmit

data on any channel until the primary channel became idle." *Id.* (citing Ex. 1008, 4:25–30, Fig. 2; Ex. 1003 ¶ 141).

Petitioner argues a person of ordinary skill "would have been motivated to use Lundby's technique of expanding the number of channels a device can utilize on an ad hoc basis" in order to "enhance the speed of Shpak's system" given Shpak's stated desire to "enhance[e] the . . . speed of WLAN systems." Pet. 42; Tr. 13:15–18. Petitioner also argues transmitting over 802.11b channels is a known technique that would improve both APs and cellular based base stations. Pet. 43. Petitioner alleges "an AP using an additional channel when desirable" is a predictable result of the combination. *Id*. (citing Ex. 1003 ¶ 130; Ex. 1016[21] ¶ 4 (explaining similarities between 802.11-compliant WLANs and cellular systems); Ex. 1014[22] ¶ 9 (similar to Ex. 1016)). In addition, Petitioner contends that adding a "secondary channel was one of the finite number of known, predictable ways to increase the speed of communications in an 802.11b system." *Id*. at 44 (citing Ex. 1003 ¶ 131 (citing, e.g., Ex. 1007 ¶¶ 23, 37 (802.11b allows for simultaneous channel transmission (¶ 27) and multichannel operations increases speed (¶ 37))).

Petitioner concludes a person of ordinary skill would have had a reasonable expectation of success in combining Shpak and Lundby because there any one of three channels available in the 802.11 standard (as available in the United States) can be added to achieve increased bandwidth and speed. Pet. 44 (citing Ex. 1005 ¶ 6; Ex. 1001, 1:45–47; Ex. 1003 ¶ 132; Ex. 1002, 306). Last, Petitioner argues adding a secondary channel would

[21] Regnier et al., US 2003/0222818 A1, published Dec. 4, 2003.
[22] Benveniste, US 2002/0086437 A1, published May 8, 2003.

have required only ordinary skill. *Id*. (citing Ex. 1003 ¶ 133; Ex. 1008, 4:37–42).

b. Patent Owner's Argument and Evidence

Relative to the preamble option selected by Petitioner, reciting in part "using *multiple wireless channels* determined to be idle by carrier sense," Patent Owner argues Shpak alone teaches transmission over a single channel. PO Resp. 20 (citing Ex. 2025,[23] 71:12–18) (emphasis added). Patent Owner contends that "Shpak teaches only that standardized methods of carrier-sensing apply to its 'common frequency channel.'" *Id*. (citing Ex. 1005 ¶¶ 5, 33). Relying on the Geier Declaration, Patent Owner asserts that "[a]t the time of Shpak, the 802.11 standards did not address multichannel systems." *Id*. at 20–21 (citing Ex. 2005 ¶¶ 79, 81 (analyzing Shpak in the Shpak and Ho combination)).

Patent Owner asserts Lundby's two channel configuration shown in Figure 2, is limited to "determin[ing] whether to transmit the signals over one channel (a primary channel) or two (primary and secondary channels)." PO Resp. 21 (citing Pet. 39; Ex. 1003 ¶120). Patent Owner cites to Dr. Williams' acknowledgment that "**there's no determination of whether to transmit disclosed by Lundby**." *Id*. at 22 (citing Ex. 2025, 27:17–19).

Regarding limitation [1A], Patent Owner's arguments are based on its proposed construction of "mandatory channel" as "one channel in a wireless multichannel communication system **whose idle state determines whether there can be a transmission** over the other channels." PO Resp. 41–42; *see* Section III.C.1 above (adopting Patent Owner's proposed construction).

[23] Transcript of Videotaped Deposition of Tim A. Williams Ph.D., Vol. 2, taken April 15, 2021.

Patent Owner then argues Shpak alone does not teach a "mandatory channel" as we have construed it "because Shpak does not disclose a multichannel system." *Id*. at 42 (citing Ex. 2005 ¶ 124; Ex. 2025, 53:1–3), 20 (citing Ex. 2025, 71:12–18 (Dr. Williams testifying about Shpak, "I don't see an explicit disclosure of multiple—multiple channels, but I don't see a preclusion of it")).

According to Patent Owner, the combination of Lundby with Shpak does not remedy the failure to show a "mandatory channel." PO Resp. 42. In addition to Shpak teaching only a single channel, Patent Owner argues Petitioner does not show how "carrier sense" of 802.11b would be applied to a "multichannel communications system." *Id*. Patent Owner acknowledges that Shpak's "common frequency channel" is cited by Petitioner as the claimed "mandatory channel" and Lundby adds another frequency channel. *Id*. (citing PO Resp. 18–31 (Response Headings IV.A–C ("Shpak," IV.A, "Lundby," IV.B, and "Shpak-Lundby," IV.C)),[24] 31–41 (Response Headings IV.D.1–2 ("Shpak-Lundby Does not Prevent Transmission when the 'Common Frequency Channel' is Busy," IV.D.1, and "Petitioner Fails to Allege Any Motivation to Modify the Decision to Transmit," IV.D.2))). Patent Owner contends "there is nothing in either Shpak or Lundby that

[24] In our analysis we follow Patent Owner's showing for claim 1 for the Shpak and Lundby challenge in the Response. *See* PO Resp. 41–47. However, the showing for claim 1 based on Shpak and Lundby cross references prior argument and supporting evidence providing additional details of the Shpak and Ho combination as they relate to the Shpak and Lundby challenge. *Id*. at 18–41. We cite to the showing regarding claim 1 for Shpak and Lundby and cite the additional portions cross referencing Shpak and Ho in the Response, including the pages, Roman numeral heading, and heading title.

prevents transmission on a given idle channel based on the status of another channel." *Id*.

Patent Owner points out that Petitioner's evidence, specifically the Williams deposition testimony, relies on Shpak to provide a "method for deciding to transmit." PO Resp. 42 (citing Ex. 2025, 41:12–19, 45:13–23, 47:3–24). Patent Owner contends that nothing about Petitioner's showing would support a determination that one channel is "always used for transmission," as required by limitation [1A]. *Id*.

Patent Owner disputes that Lundby's "secondary channel" is reserved exclusively for augmenting bandwidth. Sur-Reply 1–5. Patent Owner points out that either channel in Lundby could be used for transmission. PO Resp. 42. Patent Owner supports this contention by pointing out that Dr. Williams did not identify any preference for one channel over the other in Lundby. Sur-Reply 2 (citing Ex. 2025, 18:4–13). Patent Owner's support also relies on the timing of when Lundby checks a pool of Walsh codes at decision block 246 in Figure 2. *Id*. Patent Owner asserts that no assignment of "secondary" status occurs until after this check. *Id*. (citing Ex. 1008, 4:64–67 ("This check is done because . . . a [Walsh] code needs to be available to allocate to the secondary channel.")). Patent Owner contends "[t]his step would be unnecessary if a secondary channel were always 'reserved.'" *Id*. Patent Owner further argues that "[t]he point is not that a 'secondary' channel can be used independently of a 'primary' channel, but rather that ***any*** available code can be chosen as the 'primary' channel based on ***its own*** status." *Id*. at 2–3. Patent Owner points out that "Lundby's Fig. 2 ***assumes*** an available code is assigned 'primary' status, the decision to transmit, and assignment of 'primary' status, clearly occur before Lundby's decision tree." *Id*. at 3 (citing PO Resp. 25–28).

According to Patent Owner, Lundby does not teach sensing the idle state of one channel to make a decision to always transmit over a prioritized channel. PO Resp. 43 (citing PO Resp. 25–28 (Response Heading IV.B2 ("Lundby Neither Addresses the Decision to Transmit Nor Prevents Transmission")); Ex. 2005 ¶ 111). Patent Owner summarizes Lundby by explaining "Lundby only teaches how to add a channel to an existing ***available*** channel, without changing how that available channel was found in the first instance." *Id*. (citing PO Resp. 25–28 (Response Heading IV.B2 ("Lundby Neither Addresses the Decision to Transmit Nor Prevents Transmission")); Ex. 2005 ¶ 125).

Patent Owner concludes by arguing "[a]ll that Lundby teaches is that a 'primary' channel is a code channel that is available, and a 'secondary' channel is one that may be added ***assuming an available channel has already been found***." Sur-Reply 3 (citing PO Resp. 25–28, 35–36). As such, according to Patent Owner the assignment from "primary" to "secondary" in Lundby, or vice versa, can change "if other codes are unavailable." *Id*. (citing Ex. 2005 ¶¶ 101, 112).

Relative to limitation [1B], Patent Owner argues "[e]ven if Shpak-Lundby is considered to teach a 'mandatory channel' in step 1[A], this combination still fails to teach the step of 'transmitting . . . **only** when the mandatory channel is idle.'" PO Resp. 45. Patent Owner alleges this is because there is no teaching in either Shpak or Lundby about changing the way in which a decision to transmit is made nor is there any teaching regarding "***preventing*** transmission" when a "primary channel" is busy or unavailable but a "secondary channel" is idle and available. *Id*. at 45–46 (citing PO Resp. 25–28 (Response Heading IV.B.2 ("Lundby Neither

Addresses the Decision to Transmit Nor Prevents Transmission")); Ex. 2005 ¶¶ 130–131).

Patent Owner says Petitioner's attempt to rely on the teachings of Shpak and Lundby is in contrast to the '551 patent which allows transmission "only when the mandatory channel is idle." PO Resp. 46. Accordingly, "transmission may occur on (i) the mandatory channel by itself, or (ii) the mandatory channel together with other idle channels." *Id.* (citing PO Resp. 6–11 (Response Heading II.B ("The '551 Avoids Power Leakage by Preventing Transmission Based on a 'Mandatory Channel'")); Ex. 2005 ¶ 130; Ex. 1001, 12:13–25 (claim 1), Fig. 1). Patent Owner concludes by arguing that neither Lundby nor Shpak show that transmission occurs "only when the mandatory channel is idle." *Id.* (citing PO Resp. 25–28 (Response Heading IV.B.2 ("Lundby Neither Addresses the Decision to Transmit Nor Prevents Transmission")), 20–21 (Response Heading IV.A ("Shpak")), 28–31 (Response Heading IV.C ("Shpak-Lundby")); Ex. 2005 ¶¶ 130–131).

Regarding combining Lundby with Shpak, Patent Owner argues Shpak "only relates to single-channel systems" and would not provide any reason or motivation to change to a multichannel system. PO Resp. 38 (citing Ex. 2005 ¶ 116). Patent Owner notes Petitioner's "motivation to combine Shpak with Lundby is to increase transmission speed" by adding more channels. *Id.* at 40 (citing Pet. at 42; Ex. 1003 ¶ 126). However, according to Patent Owner, this alleged motivation "***does not*** provide any reason to prevent transmission altogether based on the status of one of multiple channels" but only suggests that "transmission should proceed whenever a channel is idle." *Id.* (citing Ex. 2005 ¶ 119).

Patent Owner argues neither Shpak nor Lundby identifies a problem, like power leakage, that would provide a motive to a person of ordinary skill to combine the two. Sur-Reply 6–7. Patent Owner contends Petitioner has not shown that "channel reservation" of the secondary channel for "bandwidth augmentation" would have been a motivation for the combination. *Id*. at 1–2 (citing Reply 5, 13–14). Patent Owner first argues Lundby lacks any teaching that the secondary channel is reserved for any special purpose. *Id*. (citing Reply 5). In addition, Patent Owner argues "[w]ithout channel reservation, nothing prevents the system from moving to another idle channel after one is found unavailable." *Id*. at 1, 2 (quoting Ex. 1008, 4:64–67 ("This **check** is done because . . . **a** [Walsh] **code needs to be available to allocate to the secondary channel**.")).

c. Determination of Shpak and Lundby Combination

Petitioner has failed to show by a preponderance of the evidence that claim 1 would have been obvious over Shpak and Lundby. We agree with Patent Owner and adopt its arguments and supporting evidence discussed above in Section III.D.3.b and further specify our findings below. We are not persuaded that a person of ordinary skill in the art would have had a reason or a motivation to combine Lundby's multichannel communication system with Shpak's single channel system. Pet. 45–47.

The Petition relies on the preamble option [1],[25] "multiple wireless channels," for this ground. Petitioner acknowledges that this limitation is not shown by Shpak and relies on Lundby. Tr. 12:23–13:12. Petitioner has not shown that the Shpak and Lundby combination teaches setting a

[25] Petitioner relies on "option [1]" of the preamble, "multiple wireless channels." Pet. 45, *see also id*. at 27 (listing three "techniques" or options of the preamble).

"mandatory channel" or transmitting wireless packets "only when the mandatory channel is idle" as recited in limitations [1A] and [1B].

Motivation to combine – "bandwidth augmentation" and reason for combining Lundby with Shpak

Shpak's discussion of communication speed is limited to the 802.11 standard enabling "higher data rates" and "enhancing . . . speed of WLAN systems." Ex. 1005 ¶¶ 3, 7. Petitioner cites to the preceding for the motivation to combine Lundby with Shpak. Pet. 42 (citing Ex. 1007, 3:49–52, Fig. 2; Ex. 1005 ¶ 7); Tr. 12:23–13:12. "[A]ny need or problem known in the field of endeavor at the time of invention and *addressed by the patent* can provide a reason for combining the elements in the manner claimed." *KSR*, 550 U.S. at 419–20 (emphasis added).

The problem addressed in the '551 patent is cross-channel leakage, not speed of communication. *See* PO Resp. 3 (citing Ex. 1001, 6:51–55). The '551 patent does not address increasing data rate or communication speed at all. Indeed, the invention claimed reduces the number of channels involved in transmission, lowering transmission rate, until the mandatory channel is idle, even when other channels are available. Ex. 1001, 12:22–25 (reciting "transmitting the wireless packets . . . only when the mandatory channel is idle" (limitation [1B])); *see also id.* at 5:55–57 ("When the mandatory channel is busy, each STA does not perform transmission even if there is other idle wireless channel.").

Whether a skilled artisan would have been motivated to combine references is a questions of fact. *See Par Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1196–97 (Fed. Cir. 2014); *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1303 (Fed. Cir. 2010). We find that speed alone is an insufficient motivation to make

the combination. The use of two channels instead of one "***does not*** provide any reason to prevent transmission altogether based on the status of one of multiple channels." PO Resp. 40 (citing Ex. 2005 ¶ 119). We agree with Patent Owner and find that "this motivation would suggest that transmission should proceed whenever a channel is idle." *Id.* The speed motivation is broad and conclusory and lacks specific evidence to support the motivation. *See Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1372 (Fed. Cir. 2000) (specific evidence beyond conclusions required to establish motivation for combination).

We find that augmented bandwidth "provides a reason to use two channels instead of one, but ***does not*** provide any reason to prevent transmission altogether based on the status of one of multiple channels." *See* PO Resp. 40 (citing Ex. 2005 ¶ 119). As such, based on the facts presented here, a person of ordinary skill would be "led in a direction divergent from the path that was taken" in the '551 patent. *Allergan, Inc. v. Sandoz Inc.*, 796 F.3d 1293, 1305 (Fed. Cir. 2015) (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)).

We are persuaded by Patent Owner's argument that at "[a]t the time of Shpak, the 802.11 standards did not address multichannel systems." PO Resp. 21 (citing Ex. 2005 (Geier Declaration) ¶¶ 79, 81). Dr. Williams does not rebut Dr. Geier's testimony. *See* generally Ex. 1062. Dr. Williams testifies that at the time the 802.11 standard did not make "the determination of busy/idle on multiple channels." *See* PO Resp. 21 n.3 (citing Ex. 2025, 72:11–25). Accordingly, "there is no disclosure in Shpak regarding how carrier-sensing may function in a ***multichannel*** system." *Id*. at 21 (citing Ex. 2005 ¶ 81). We are not persuaded that the 802.11 standard addresses a multichannel system directed to increasing speed of transmission.

Petitioner also argues a person of ordinary skill "would have had reasons to implement Shpak, in view of Lundby," by using Shpak's "common frequency channel" as a "primary channel" and using "another available 802.11b channel as a 'secondary channel' to augment the primary channel's bandwidth such that wireless packets are transmitted on both channels simultaneously." Pet. 41–44 (citing Ex. 1003 ¶¶ 124–132). Petitioner cites Lundby for its teaching of a primary and secondary channel, i.e., a multichannel system, in a CDMA system made up of cells. *Id*. at 39 (citing Ex. 1008, code (57), Fig. 2 (*see* Section III.D.2 above)).

Neither the Petition nor the Williams Declaration provides any persuasive additional argument as to why a person of ordinary skill would combine Lundby with Shpak. The citation to the Williams Declaration relates primarily to motivation and the known technique present in the 802.11 standard previously discussed. See, e.g., Ex. 1003 ¶¶ 126–130. Petitioner's argument for the combination is fundamentally based on a person of ordinary skill knowing to add channels of Lundby to Shpak's single channel to achieve more bandwidth in the combined system. Tr. 12:23–13:12. This argument is addressed above.

Limitation [1A] "setting a mandatory channel that is always used for transmission"

We find that Shpak teaches a "method for deciding to transmit" over a single channel.[26] Thus, there are no channels from which to "set" or select a single channel. *See* PO Resp. 13 (citing Ex. 2005 ¶¶ 50, 66). Contrasted with Shpak's single channel transmission, both experts agree that

[26] We agree with Patent Owner that Shpak was presented in the Petition as a single channel system, and any effort to "recast [Shpak] as a multi-channel system is a new argument" that we disregard. Tr. 67:6–19.

"multichannel" transmission as described and claimed in the '551 patent is simultaneous transmission over multiple channels. Ex. 1003 ¶ 36 (citing Ex. 1007 ¶ 46; Ex. 1001, 1:43–55); Ex. 2005 ¶ 48 (citing Ex. 1001, 1:43–48).

Shpak does not teach "setting" a channel from one of multiple channels available for use. Ex. 2005 ¶ 124; Ex. 2025, 53:1–3.

Petitioner does not dispute our findings on Shpak and relies on Lundby for limitation [1A]. Pet. 46 (citing Ex. 1008, 3:49–4:55, Fig. 2; Ex. 1003 ¶ 140); *see also* Reply 12 (arguing that "unmodified Shpak APs only transmit data over the 'common frequency channel'" and must be modified by Lundby's multichannel system).

Petitioner's citation to Lundby includes a detailed description of Figure 2 which discusses whether the primary channel alone or both the primary channel and secondary channel will be used for transmission. *See* Ex. 1008, 4:25–30. Dr. Williams testifies that either option requires the primary channel to be used for transmission and thus that "the primary channel is always used for transmission." Ex. 1003 ¶ 140.

Neither Shpak's "common frequency channel" nor Lundby's primary channel is the recited "mandatory channel." We construed "mandatory channel to mean "one channel in a wireless multichannel communication system whose idle state determines whether there can be a transmission over the other wireless channels." Section III.C.1 above. Neither Shpak nor Lundby teaches controlling whether transmission takes place over other channels based on the idle state of one "mandatory channel," as required by our construction. If Lundby's primary channel is idle, there is no suggestion that the secondary channel cannot be used for transmission. Indeed, in order to augment bandwidth, the primary channel must be busy before the secondary channel is used, which is the opposite of the idle state required for

the "mandatory channel." Neither reference teaches a "mandatory channel" as recited in limitation [1A].

Limitation [1B] "transmitting . . . only when the mandatory channel is idle"

As we determined in our discussion of limitation [1A], neither Shpak nor Lundby teaches a "mandatory channel" as we have construed that term. Our construction of "mandatory channel" requires, in part, a "determin[ation] whether there can be a transmission over the other wireless channels." Shpak's single channel, whether transmitting or not, cannot affect another channel because there is no other channel. Shpak does teach using the 802.11 standard's "mechanism for collision avoidance known as clear channel assessment (CCA), which requires a station to refrain from transmitting when it senses other transmissions on its frequency channel." Ex. 1003 ¶ 99 (quoting Ex. 1005 ¶ 5). Shpak does not teach sensing an idle state to determine whether to transmit on another channel because none exists.

Lundby describes when two channels, i.e. a multichannel system, are desirable. Lundby discloses "[t]he only criterion for selecting a parameter for use in decision block 246 is whether the parameter can be used to optimize the communication system in some way." *See* Ex. 1008, 4:31–35. For example, Lundby describes how an encoded bit stream may "be transmitted on a single channel or whether a lower rate encoded bit stream should be transmitted in portions over two channels." *Id.* at 4:26–30.

We find that Lundby's two-channel system does not determine whether to transmit on one channel based on the status of the other channel. Dr. Williams acknowledges that "there's no determination of whether to transmit disclosed by Lundby." Ex. 2025, 27:17–19. The decision to transmit, i.e., sensing the busy or idle state of the "mandatory channel" and

transmitting based on sensing an idle state, occurs before Lundby's decision tree of Figure 2. *Id*. at 45:7–18, 47:12–23. In other words, transmission in Lundby is independent of the idle state of either the primary or secondary channels. Thus, we find that neither Lundby nor Shpak teaches or suggests limitation [1B]. We accordingly conclude that Petitioner has not demonstrated claim 1 to be unpatentable over the combination of Shpak and Lundby.

4. Claims 3–5, 7, and 8

Claim 5 is an independent claim that is of virtually identical scope to claim 1. *Compare* Ex. 1001, 12:13–25, *with* Ex. 1001, 12:56–13:67; Pet. 64–65 ("Claim 5 recites an apparatus that performs the method of claim 1."). Claims 3 and 4 are alternatively dependent on claims 1 or 2. To the extent they are dependent on claim 1, we conclude that Petitioner has not demonstrated claims 3 and 4 to be unpatentable over Shpak and Lundby for the same reasons as set forth for claim 1.

Claims 7 and 8 are multiple dependent apparatus claims that each depend in the alternative from independent claims 5 or 6. To the extent they are dependent on claim 5, we conclude that Petitioner has not demonstrated claims 7 and 8 to be unpatentable over Shpak and Lundby for the same reasons as set forth for claim 5.

5. Conclusion on Obviousness of Claims 1, 3–5, 7, and 8 over Shpak and Lundby

Petitioner has failed to show by a preponderance of the evidence that claims 1 and 5 would have been obvious over Shpak and Lundby. To the extent claims 3 and 4 depend from claim 1 and claims 7 and 8 depend from claim 5, Petitioner has failed to show by a preponderance of the evidence that claims 3, 4, 7, and 8 would have been obvious over Shpak and Lundby.

E. Obviousness of Claims 1, 3, 5, 7 over Shpak and Ho

Petitioner alleges claims 1, 3, 5, and 7 would have been obvious over Shpak and Ho. Pet. 5. Petitioner also relies on the Williams Declaration. Ex. 1003 ¶¶ 64–118.

1. Shpak (Ex. 1005)

Shpak is described in Section III.D.1 above.

2. Ho (Ex. 1006)

Ho relates to "wireless communications," including "medium access control (MAC) frames and mechanisms enabling smart antenna use, improving channel utilization, and increasing communications throughput." Ex. 1006 ¶ 4. Ho's system is described "in the context of . . . 802.11." *Id.* ¶ 36. Ho explains that to "implement a wireless network, each device (computer, access point, etc.) includes one or more antennas through which data is transmitted or received." *Id.* ¶ 7. Ho explains that in a SISO configuration, one antenna is used for both transmission and receipt of data over a single wireless link. *Id.*

In a "2x2" MIMO configuration, in contrast, two antennas are used, "establishing two simultaneously available communication links." Ex. 1006 ¶ 9. In a MIMO configuration the information contained in data frame may be transmitted in less time than SISO. *Id.* With MIMO, time between transmission of data and acknowledgement is reduced over SISO because "the bit stream can be broken into two parts and the parts can then be transmitted simultaneously via the two communication links." *Id.* ¶ 10.

3. Claim 1

For the preamble limitation [1PRE], as discussed above in Section III.D.3, Petitioner argues that claim 1 requires one of three methods of transmission for wireless packets. For this ground, Petitioner relies on

Shpak and the alternative reciting a "single wireless channel determined to be idle and MIMO." Pet. 31–32 (citing Ex. 1005 ¶¶ 11, 22, 33, 37, 51; Ex. 1003 ¶ 97). Ho is cited only for its teaching of MIMO. *Id*. at 31 (citing Ex. 1006 ¶¶ 9–10, Figs. 4a–4c; Ex. 1003 ¶¶ 74–79).

As we find above in Section III.D.3.c, Shpak includes only a single channel and Shpak cannot teach a "mandatory channel" as we have construed the term. Pet. 20–21 (citing Ex. 1001, 6:8–11; Ex. 2005 ¶¶ 73, 81). Based on our construction of "mandatory channel" (*see* Section III.C.1 above), multiple transmission channels are required by claim 1, which are not taught by Shpak.

4. Claims 3, 5, and 7

Claim 5 is an independent claim that is of virtually identical scope to claim 1. *Compare* Ex. 1001, 12:13–25, *with* Ex. 1001, 12:56–13:67; Pet. 38 ("Shpak-Ho's AP is 'a wireless packet communication apparatus' and meets claim 5's preamble for the same reasons it meets claim 1's preamble.) (citing Pet. 27–30 (Heading V.A.4.a)); Ex. 1003 ¶¶ 114–115."). Claim 3 is alternatively dependent on claims 1 or 2. To the extent claim 3 is dependent on claim 1, we conclude that Petitioner has not demonstrated unpatentability of claim 3 over Shpak and Ho for the same reasons as set forth for claim 1. Similarly, claim 7 is alternatively dependent from independent claims 5 or 6. To the extent claim 7 is dependent on claim 5, we conclude that Petitioner has not demonstrated unpatentability of claim 7 for the same reasons as set forth for claim 5.

5. Conclusion on Obviousness of Claims 1, 3, 5, and 7 over Shpak and Ho

Petitioner has failed to show by a preponderance of the evidence that claims 1 and 5 would have been obvious over Shpak and Ho. To the extent claims 3 depends from claim 1 and claim 7 depends from claim 5, Petitioner

has failed to show by a preponderance of the evidence that claims 3 and 7 would have been obvious over Shpak and Ho. The Petition does not challenge claims 2 and 6 over Shpak and Ho, and we do not make any determination as to the patentability of claims 3 and 7 over Shpak and Ho to the extent they depend from claims 2 and 6, respectively.

F. Obviousness of Claims 1–3 and 5–7 over Bugeja and Ho

Petitioner alleges claims 1–3 and 5–7 would have been obvious over Bugeja and Ho. Pet. 52–71. Petitioner also relies on the Williams Declaration. Ex. 1003 ¶¶ 160–234.

1. Bugeja (Ex. 1007)

Bugeja discloses a system using "multichannel wireless access points." Ex. 1007, code (57). Bugeja explains conventional 802.11 compliant WLANs provided three independent channels each with a different center frequency, 1, 6, or 11, over which APs (access points) can communicate with clients, selecting the channel with the best signal strength. *Id.* at code (57), ¶¶ 4–5, 23. The three channels "provide the minimum number of channels required for a two-dimensional frequency re-use scheme to eliminate interference between adjacent cells." *Id.* ¶ 24. Clients within the cell can communicate on any of the three available channels; however, "with each multi-channel access point communicating simultaneously on the same three channels, interference between adjacent cells can result." *Id.* ¶ 27.

Each cell has one or more primary channels and "[a]n access point within a cell transmits at a lesser power on a secondary channel exclusive of the primary channel and assigns channels to wireless clients." Ex. 1007 ¶ 7. A "frequency reuse scheme is implemented by configuring each multichannel access point 402 to transmit on full power on a primary

channel and on less power on secondary channels." *Id.* ¶ 30. In one embodiment, two secondary channels in each multichannel access point transmit at half the maximum power, while a primary channel is transmitted at full power. *Id.* ¶ 34.

"Clients generally transmit at full-power and use the channel that the multichannel access point [] assigns for transmitting." Ex. 1007 ¶ 31. Based on the strength of a client's signal, access points determine whether to accept a client's transmission. *Id.* ¶¶ 31–32. The client hops between frequencies, i.e., channels, until assigned to either the APs primary channel or a secondary channel based on signal strength. *Id.* Figure 4 is reproduced below.

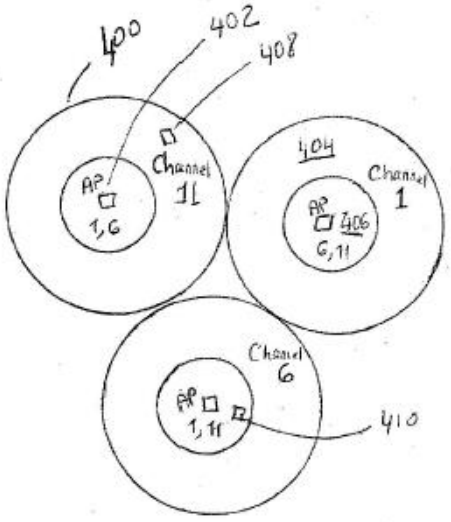

Figure 4 illustrates a wireless Local Area Network having a plurality of multi-channel access points configured for a frequency reuse scheme.

Ex. 1007 ¶ 14. Referring to Figure 4, each AP 402 is positioned at the center of cell 400 that "represents the coverage area within which clients

408, 410 can communicate with a particular multichannel access point 402." *Id.* ¶ 30. If the signal indicates the client is in the cell's "outer region" (e.g., Figure 4's client 408), the client is always assigned the primary channel. *Id.* ¶ 32. Conversely, if the signal indicates the client is in the inner region (e.g., Figure 4's client 410), it is "assigned the primary channel or any of the secondary channels, but likely one of the secondary channels to free the primary for peripheral [outer-region] clients." *Id.* ¶ 33. "Based on the detected power level, the access point determines whether the mobile client is in the inner region 406 or the outer region 404." *Id.* ¶ 35.

2. Ho (Ex. 1006)

Ho is described in Section III.E.2 above.

3. Claim 1

Like for the Shpak-based grounds discussed above, Petitioner again relies on the preamble option for "a single wireless channel determined to be idle and MIMO" for the Bugeja-based grounds. Pet. 58. Petitioner's showing does not meet our construction of "mandatory channel." Although Bugeja teaches both primary and secondary channels, Petitioner relies on Bugeja's "primary channel" as the "single wireless channel." *Id.* at 59. More specifically, Petitioner argues "Bugeja-Ho's APs would divide a conventional 802.11 wireless data packet into multiple (e.g., two) separate packets that would be communicated 'simultaneously' over, for example, the MIMO subchannels of the primary channel the AP exclusively uses to communicate with an outer-region client." *Id.* (citing Ex. 1006 ¶ 10; Ex. 1007 ¶¶ 28–33, claim 9, Fig. 4; Ex. 1003 ¶182). Petitioner cites Ho for the MIMO requirement of the preamble. *Id.* (citing Ex. 1006 ¶¶ 9–10, Figs. 4a–4c; Ex. 1003 ¶¶ 74–79). Petitioner concludes by arguing Bugeja and Ho's AP thus performs the claimed "'wireless packet communication

method for transmitting a plurality of wireless packets simultaneously by using' option [2], i.e., 'a single wireless channel' (i.e., Bugeja's primary channel) 'determined to be idle and MIMO.'" *Id*. at 59.

Bugeja's "primary channel" is not the recited "mandatory channel" because there is no teaching that no transmission occurs on the secondary channels only when the primary channel is not transmitting, i.e., is idle. Furthermore, Bugeja is fundamentally different from the '551 patent claims. Bugeja's multichannel access point assigns a channel for transmitting, and Bugeja explains that clients generally transmit at full power using the assigned channel. Ex. 1007 ¶ 31. Bugeja further explains that the client typically "hops" between available channels until an access point accepts the client's "beacon" signal. *Id.* Thus, in Bugeja, the client *may* be assigned a secondary channel depending on power level of the client. Ex. 1007 ¶¶ 32–33. Bugeja's secondary channel is used based upon *availability* and the *client's power level*. *Id.*

As we have interpreted the claims of the '551 patent, *even if a channel is available*, it is not used unless the mandatory channel is determined to be idle. *See*, Ex. 1001, 3:56–57 ("[W]hen the mandatory channel is busy, each STA does not perform transmission even if there is other idle wireless channel."), 12:22–25 (claim 1) (reciting "transmitting the wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, *only when the mandatory channel is idle*"). Under our final construction of "mandatory channel," the '551 patent system transmission is controlled by "setting a mandatory channel" which is always used for transmission but which must be idle before any other channel of the multichannel system is available for transmission. *See* Section III.C.1 above. Bugeja does not control or limit what channels can transmit based on

the idle status of one "set" channel. Ho does not remedy this deficiency as Ho is cited only as teaching MIMO. Tr. 36:23 (Petitioner representing that in the Bugeja and Ho combination, "Ho is just added here to disclose MIMO").

We find that no channel is "set" as the "mandatory channel" in Bugeja as required by limitation [1A]. We credit Dr. Geier's testimony that transmission in Bugeja is over "all available channels . . . indiscriminately." PO Resp. 54 (citing Ex. 2005 ¶ 152). Dr. Williams' Reply Declaration does not address the Bugeja and Ho combination. *See* generally Ex. 1062. We therefore find Bugeja teaches there is no transmission priority as among channels. PO Resp. 54 (citing Ex. 2005 ¶ 111[27]). As the Specification explains, "the mandatory channel can be regarded as a wireless channel having the highest priority among wireless channels that have a plurality of priorities." Ex. 1001, 3:58–60.

We do not agree with Petitioner that our construction of "mandatory channel" is limited to a "channel a transmitting station uses for ***all*** transmissions to ***all*** receiving stations—instead of just for all transmissions to a particular station for which the 'mandatory channel' is set." Reply 15–16 (citing Ex. 1001, 12:25–43 (claim 2) (*see* Section III.F.4 below)).

4. Claims 2 and 6

Claims 2 and 6 are independent method and apparatus claims that differ from claims 1 and 5, respectively, in that two end point stations are recited, STA A and STA B. Ex. 1001, 12:32–43 (claim 2), 13:7–17 (claim 6). STA includes a mandatory channel while STA B has no mandatory channel, permitting transmission on idle channels.

[27] Patent Owner's Response incorrectly cites paragraph 152.

Petitioner argues that the preamble of claims 2 is identical to that of claim 1 and that claim 6 recites an apparatus that performs claim 2's method. Pet. 65, 71. For the same reasons cited for claim 1, the preamble limitations of claims 2 and 6 are not shown because they do not meet our construction of "mandatory channel" which requires multiple channels. *See* Section III.C.1 above.

Claim 2 includes STA A for which a "mandatory channel" is set and STA B for which no "mandatory channel" is set. Claim 2 still requires STA A to have a mandatory channel even if STA B does not. Petitioner contends that "all" system transmission is controlled, but Petitioner does not point to anything in our construction of "mandatory channel" to support the contention. Reply 15–16; *see* Section III.C.1 above ("mandatory channel" means "one channel in a wireless multichannel communication system whose idle state determines whether there can be a transmission over the other wireless channels").

Further, for limitation [2B] Petitioner relies on Bugeja's AP's use of carrier sense and the Williams Declaration to argue the "primary channel" sends "packets over the primary channel if it is idle." Pet. 69 (citing Pet. 55–58 (citing Ex. 1007 ¶¶ 53, 59, Figs. 8–10 (arguing person of ordinary skill would have understood each Bugeja AP to be a SISO channel)); Ex. 1003 ¶ 225). The citation to Bugeja is not persuasive to show that transmission is not allowed unless the "primary channel" is idle as recited in limitation [2B]. *See* Section III.C.1 above; PO Resp. 61 (citing PO Resp. 58–59 (showing for limitation [1B])). Paragraph 225 of the Williams Declaration addresses the use of a single channel for transmission. It does not include any support upon which we could find that an idle channel prevents transmission on any other channel.

Petitioner cites paragraph 225 of the Williams Declaration to argue "APs use carrier sense and only send packets over the primary channel if it is idle." Pet. 69 (citing Ex. 1003 ¶ 225). However, the cited paragraph of the Williams Declaration says only that the primary channel of Bugeja, i.e., the alleged "mandatory channel" and is always used when addressing wireless packets to an "outer region client." Ex. 1003 ¶ 225. Neither does carrier sense under the 802.11 standard provide any support for the assertion. The 802.11 standard is limited to sensing whether or not a channel is not transmitting and is therefore available. *See, e.g.*, Ex. 1005 ¶ 5 ("The 802.11 standard provides a mechanism for collision avoidance known as clear channel assessment (CCA), which requires a station to refrain from transmitting when it senses other transmissions on its frequency channel.").

Claim 6 is an apparatus claim which "performs claim 2's method." *See* Pet. 71. For the reasons stated in connection with claim 2 Petitioner has not shown claim 6 is unpatentable.

5. Claims 3, 5, and 7

Claim 5 is an independent claim directed to an apparatus of similar scope to method claim 1. Petitioner adds citations to the reference's physical components, but otherwise relies on its showing for claim 1. Pet. 65. Claim 3 depends from claims 1 or 2. Claim 7 depends from claims 5 or 6. We refer to our analysis of claims 1, 2, and 6 as relevant to Petitioner's showing for claims 3, 5, and 7.

6. Conclusion on Obviousness of Claims 1–3 and 5–7 over Bugeja and Ho

Petitioner has failed to show by a preponderance of the evidence that claims 1–3 and 5–7 would have been obvious over Bugeja and Ho.

G. Obviousness of Claims 4 and 8 over Shpak, Ho, and Thielecke or over Bugeja, Ho, and Thielecke

Petitioner alleges claims 4 and 8 would have been obvious over Shpak or Bugeja in combination with both Ho and Thielecke. Pet. 71–74. Petitioner also relies on the Williams Declaration. Ex. 1003 ¶¶ 237–256.

1. Shpak (Ex. 1005)

Shpak is described in Section III.D.1 above.

2. Bugeja (Ex. 1007)

Bugeja is described in Section III.F.1 above.

3. Ho (Ex. 1005)

Ho is described in Section III.E.2 above.

4. Thielecke (Ex. 1035)

Thielecke "present[s] a solution for best exploitation of a MIMO channel." Ex. 1035 ¶ 29. Thielecke measures "channel conditions" on "strata" or "layers." *Id.* ¶¶ 29, 31. Then, "[d]epending on the channel conditions," the data rate of "one or more strata [may be] very small" such that "it is usually advantageous to reduce the number of strata." *Id.* ¶ 31.

5. Claims 4 and 8

Claim 4 is a method claim which depends from claims 1 or 2. Claim 8 is an apparatus claim which depends from claims 5 or 6. Beyond the method and apparatus difference, the claims are all but identical, both reciting "simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO in accordance with a number of pieces of data or a number of MIMOs that depends on a channel condition." Petitioner relies on Thielecke for this recitation but does not allege that Thielecke remedies the deficiencies of Shpak, Bugeja, and Ho with respect to the recitations of the base claims as discussed in the above analyses of

claims 1, 2, 5, and 6 under the Shpak-Ho and Bugeja-Ho combinations in Sections III.E and III.F. *See* Pet. 71–74.

For the reasons set forth above with respect to claims 1, 2, 5, and 6 (*see* Sections III.E.3, III.E.4, III.F.3–III.F.5), we conclude that Petitioner has failed to show by a preponderance of the evidence that claims 4 and 8 would have been obvious over Shpak, Ho, and Thielecke or over Bugeja, Ho, and Thielecke.

6. Conclusion on Obviousness of Claims 4 and 8 over Shpak, Ho, and Thielecke or over Bugeja, Ho, and Thielecke

Petitioner has failed to show by a preponderance of the evidence that claims 4 and 8 would have been obvious over Shpak/Ho or Bugeja/Ho and Thielecke.

IV. CONCLUSION

For the reasons discussed above, Petitioner has not shown by a preponderance of the evidence that claims 1–8 of the '551 patent are unpatentable over any asserted ground.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED, that Petitioner has not shown that any of the challenged claims are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

In summary:

Claims	**35 U.S.C. §**	**Reference(s)/Basis**	**Claims Shown Unpatentable**	**Claims Not Shown Unpatentable**
1, 3–5, 7, 8	103	Shpak, Lundby		1, 3–5, 7, 8
1, 3, 5, 7	103	Shpak, Ho		1, 3, 5, 7
1–3, 5–7	103	Bugeja, Ho		1–3, 5–7
4, 8	103	Shpak, Ho, Thielecke		4, 8
4, 8	103	Bugeja, Ho, Thielecke		4, 8
Overall Outcome				1–8

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