

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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MEDIATEK INC. and  
MEDIATEK USA, INC.,

Petitioners,

v.

NIPPON TELEGRAPH AND TELEPHONE CORPORATION,  
Patent Owner.

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Case IPR2020-01404  
Patent 7,280,551

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**PATENT OWNER'S RESPONSE TO  
PETITION FOR INTER PARTES REVIEW  
UNDER 37 C.F.R. § 42.120**

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**LIST OF EXHIBITS**

<b>Exhibit No.</b>	<b>Description</b>
2001	Amended Scheduling Order, C.A. No. 1:20-cv- 00583-ADA, -00632-ADA, -00769-ADA (WDTX), Dkt. No. 36 (“Amended Scheduling Order”)
2002	Complaint, C.A. No. 1:20-cv-00632-ADA (WDTX) Dkt. No. 1
2003	Ninth Supplemental Order Regarding Court Operations Under the Exigent Circumstances Created By The COVID-19 Pandemic, Oct. 14, 2020
2004	“Texas Patent Judges Diverge on Covid-19 Trial Protocols,” Carstens & Cahoon, LLP (Summary of Law360 article), Oct. 19, 2020, available at <a href="https://cclaw.com/2020/10/19/texas-patent-judges-diverge-on-covid-19-trial-protocols/">https://cclaw.com/2020/10/19/texas-patent-judges-diverge-on-covid-19-trial-protocols/</a>
2005	Declaration of James T. Geier, Nov. 20, 2020
2006	Kin K. Leung, <i>Outdoor IEEE 802.11 Cellular Networks: MAC Protocol Design and Performance</i> , 2002 IEEE International Conference on Communications New York, New York, USA, April 28-May 2, 2002 (“Leung 2002”)
2007	Univ. Rochester ECE, “Lecture 2 Media Access Control,” 2002 (“Rochester Lecture”)
2008	A. D. Myers and S. Basagni. Handbook of Wireless Networks and Mobile Computing, chapter 6: Wireless Media Access Control (“Myers”); Wiley Series on Parallel and Distributed Computing. John Wiley & Sons, Inc., New York, February 2002. I. Stojmenovic, ed. (“Myers 2002”)
2009	Cornell Univ. CS, “13: Link Layer, Multiple Access Protocols,” Apr. 9, 2003 (“Cornell Lecture”)
2010	John G. Proakis, Digital Communications (4th ed. 2001)
2011	Sky DSP “CDMA Results,” 1997-2001, available at <a href="http://www.skydsp.com/publications/4thyrthesis/chapter3.htm">http://www.skydsp.com/publications/4thyrthesis/chapter3.htm</a> (“CDMA Results”)
2012	Northeastern Univ., “Medium Access Control (MAC), and Wireless LANs” 2000, at 18, available at <a href="https://www.ccs.neu.edu/home/rraj/Courses/6710/S10/Lectures/WirelessLANs.pdf">https://www.ccs.neu.edu/home/rraj/Courses/6710/S10/Lectures/WirelessLANs.pdf</a> (“Northeastern Lecture”)

Exhibit No.	Description
2013	Defendant's Preliminary Proposed Constructions, C.A. No. 1:20-cv- 00583-ADA, -00632-ADA, -00769-ADA (WDTX), Nov. 3, 2020
2014	"CDMA-Quick Guide;" available at <a href="https://www.tutorialspoint.com/cdma/cdma_quick_guide.htm">https://www.tutorialspoint.com/cdma/cdma_quick_guide.htm</a>
2015	"CDMA Testing," Nov. 1, 1996, available at <a href="https://www.evaluationengineering.com/home/article/13000580/what-is-cdma-and-how-is-it-tested">https://www.evaluationengineering.com/home/article/13000580/what-is-cdma-and-how-is-it-tested</a>
2016	Plaintiff's Proposed Constructions, C.A. No. 1:20-cv- 00583-ADA, -00632-ADA, -00769-ADA (WDTX), Nov. 3, 2020
2017	Minute Order, July 22, 2020, <i>Continental Intermodal Group—Trucking LLC v. Sand Revolution LLC, et al</i> (7-18-cv-00147 (WDTX))
2018	Docket Navigator Time to Milestones Summary
2019	Summary of J. Albright Orders on Opposed Motions to Stay
2020	IAMS J. Albright Interview, available at <a href="https://www.iam-media.com/law-policy/albright-the-last-thing-anyone-should-think-about-venue-it-plaintiff-friendly">https://www.iam-media.com/law-policy/albright-the-last-thing-anyone-should-think-about-venue-it-plaintiff-friendly</a>
2021	Defendant's Preliminary Invalidity Contentions, C.A. No. 1:20-cv- 00583-ADA, -00632-ADA, -00769-ADA (WDTX), Oct. 6, 2020
2022	Univ. North Carolina, Wireless and Mobile Communications, "Medium Access Control," ("UNC Lecture") at 5, available at <a href="https://www.cs.unc.edu/~jasleen/Courses/Fall17-635/slides/4A-MAC-layer.pdf">https://www.cs.unc.edu/~jasleen/Courses/Fall17-635/slides/4A-MAC-layer.pdf</a> .
2023	Joint Claim Construction Statement, C.A. No. 1:20-cv- 00583-ADA, -00632-ADA, -00769-ADA (WDTX), Jan. 28, 2021 (NOT FILED; PROVIDED DURING DEPOSITION)
2024	Deposition Transcript of Tim A. Williams, Ph.D., Vol. 1, Case No. IPR2020-01404, April 9, 2021 ("Williams1")
2025	Deposition Transcript of Tim A. Williams, Ph.D., Vol. 2, Case No. IPR2020-01404, April 15, 2021 ("Williams2")
2026	Declaration of James T. Geier, May19, 2021 ("Geier")
2027	A. Nasipuri, J. Zhuang and S. R. Das, "A multichannel CSMA MAC protocol for multihop wireless networks," 1999 IEEE Wireless Communications and Networking Conference (1999), pp. 1402-1406 vol.3 ("Nasipuri")

Exhibit No.	Description
2028	Yang, S. C. <i>3G CDMA2000: Wireless System Engineering</i> (2004) (“Yang”)
2029	G. Giunta, “Basic note on Spread Spectrum CDMA signals,” Digital Signal Processing course, Third University of Rome, (May 2000) (“Giunta”)
2030	U.S. Patent No. 5,623,485 (“Bi”)
2031	Mishra, Arunesh, et al., <i>Exploiting Partially Overlapping Channels in Wireless Networks: Turning a Peril into an Advantage</i> , Proceedings of the 5th Conference on Internet Measurement (2005) (“Mishra”)
2032	U.S. Patent No. 7,539,162 (“Zhang”)



## I. INTRODUCTION

Nippon Telegraph and Telephone Co. (“NTT” or “Patent Owner”) respectfully requests that the Board determine that MediaTek, Inc. and MediaTek USA (collectively, “MT” or “Petitioner”) has failed to demonstrate the unpatentability of U.S. Patent No. 7,280,551 (“the ’551 Patent”).

First, NTT agrees with the Board’s preliminary construction of “mandatory channel” as “one channel in a wireless multichannel communication system.”<sup>1</sup> *See* Paper 14 (DI) at 20-21. Moreover, NTT agrees that “the purpose of the ’551 patent is to transmit 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,**’” so as to “avoid ‘leakage’ between channels.” *Id.* at 19<sup>2</sup> (emphasis in original). In other words, the ’551 *changes the way multichannel systems decide whether to transmit*—rather than transmitting on a channel based simply on its *own* idle state, the ’551 Patent’s multichannel system also requires looking to the state of a “mandatory channel” in deciding

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<sup>1</sup> As discussed in detail herein, NTT generally agrees with the Board’s conclusion, with one small proposed modification: that the “mandatory channel” be “one channel in a wireless multichannel communication system whose idle state determines whether there can be a transmission over the other channels.” This modification more closely aligns with the claim language and specification, both of which tie the “mandatory channel’s” *idle state* to transmissions.

<sup>2</sup> All emphases are added unless explicitly noted, as here.

whether a transmission is permitted. Thus, the claim language limits transmission to times “*only* when the mandatory channel is idle.” *E.g.*, cl. 1. Therefore, Petitioner’s asserted grounds treating the “mandatory channel” as a channel in a *single-channel* system—Grounds 1, 4 (Shpak’s “common frequency channel” and Ho’s MIMO for single channel) and 3 (Bugeja’s “primary channel,” and Ho)—fail at least because they rely on an incorrect interpretation of the ’551 Patent.

Second, Petitioner fails to demonstrate that any of the ’551 claims are unpatentable over Ground 2 (Shpak and Lundby). Indeed, *even if* a person of ordinary skill in the art (“POSA”) combined Shpak and Lundby in the manner Petitioner claims—namely, by adding another frequency channel to Shpak and using these channels using Lundby’s methods (*see* Paper 2 (“Pet.”) at 41-44, EX1003 (hereinafter “Williams Decl.”) at ¶¶124-133)—one would *still* not arrive at the steps claimed in the ’551 Patent. Lundby, as Petitioner’s own expert repeatedly acknowledges, simply **does not address the decision to transmit**. *E.g.*, EX2025 (hereinafter “Williams2”) at 41:12-15 (“*Lundby doesn’t disclose the decision to transmit based on the idle nature of . . . what Lundby calls the primary channel.*”), 44:21-23 (“Lundby, as we discussed before, is post the decision to transmit.”). Rather, the **only** decision that Lundby presents is whether to transmit on one channel or two—there is no hint of what should happen if the primary channel is unavailable, nor any scenario where transmission is prevented.

EX2026 (hereinafter “Geier”) at ¶98. Shpak does not supply this teaching because Shpak does not address multichannel systems. Geier at ¶¶79-81; Williams2 at 71:15-18. In the absence of any such teaching, Petitioner has failed to allege any reason why a POSA would deviate from standard CDMA or CSMA practice and prevent transmission on otherwise available channels based on the status of just one channel in a multichannel system. Geier Decl. at ¶¶65-66, 74-75. Thus, Shpak-Lundby fails to disclose at least the step of “transmitting wireless packets...*only* when the mandatory channel is idle.” Geier at ¶107. Further, as discussed below, Shpak-Lundby fails to disclose the claimed “mandatory channel,” because this term should properly be construed as a channel “**whose idle state determines whether there can be a transmission.**” *Id.* at ¶63.

## **II. THE ’551 ADDRESSES POWER LEAKAGE BY PREVENTING TRANSMISSION WHEN THE “MANDATORY CHANNEL” IS NOT IDLE**

NTT agrees with the Board that the ’551 Patent relates to multichannel systems, as opposed to single-channel systems. *See* Paper 14 at 20. More specifically, the ’551 Patent teaches a method to avoid the problems caused by power leakage between frequency channels, by *preventing transmission* on available channels “when the mandatory channel is busy even if another wireless channel is idle.” *E.g.*, ’551 Patent at 6:51-55.

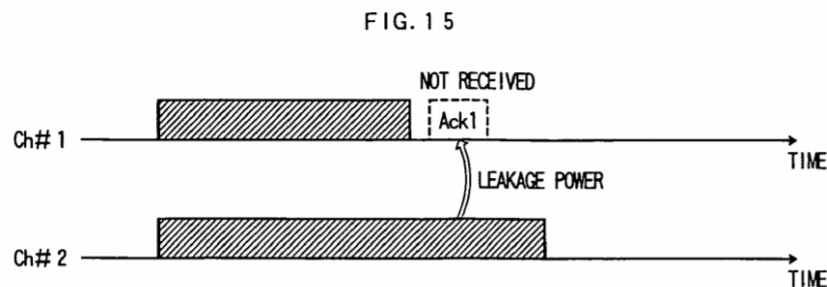
**A. The '551 Patent Addresses Power Leakage in Multichannel Systems**

Petitioner will likely reprise its argument that the claimed “mandatory channel” can be the *only* channel provided, such as in a conventional single-channel system. However, upon reading the claims in the context of the specification—as required by Federal Circuit precedent—this argument fails. *See, e.g., Netcraft Corp. v. eBay, Inc.*, 549 F.3d 1394, 1396–97 (Fed. Cir. 2008) (POSA “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.**”). Rather, the specification makes clear that the '551 Patent addresses issues arising in *multichannel* systems.

For example, the specification contrasts multichannel systems wherein “**multiple wireless channels are found idle** by carrier sense,” such that “a plurality of wireless packets are transmitted **simultaneously by using the wireless channels**” (*id.* at 1:43-47) with conventional single-channel systems that use carrier-sensing “**to share one wireless channel** in a staggered manner” (*id.* at 1:25-37). The specification goes on to define the motivating problem as follows: “In the case where center frequencies of **multiple wireless channels used at the same time are close to each other**, an effect of leakage power from one wireless channel to a frequency region used by another wireless channel becomes large.”

'551 Patent at 2:26-30. Notably, the phrasing used to describe this problem matches the language used to describe multichannel systems, as distinguished from single-channel systems addressed above. Thus, the '551 is directed to solving is a *multichannel* problem. Geier at ¶52.

The specification teaches that power leakage reduces the enhancement in *throughput* ordinarily expected from multichannel systems. Geier at ¶53; '551 Patent at 1:43-55; 2:38-51. This may be illustrated by the effect of leakage on acknowledgement (ACK) packets when multiple channels are in use: “[I]n 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 used *for simultaneous transmission*” is in use. '551 Patent at 2:30-37. If there is leakage between a channel #1 and channel #2 (Fig. 15, below), “the wireless channel #1 may not receive that ACK packet (Ack1) because of leakage power from the wireless channel #2.



As a result, “*throughput* cannot be improved *even if simultaneous transmission is performed using multiple wireless channels* at the same time.” *Id.* at 2:48-51. “Throughput,” as used in the ’551 Patent, relates to transmission to a given user. Geier at ¶54. Thus, although using multiple channels between two STAs would be expected to improve throughput, the ’551 Patent teaches that power leakage between channels can erode this advantage by interfering with proper ACK receipt, prompting needless retransmissions. *Id.*

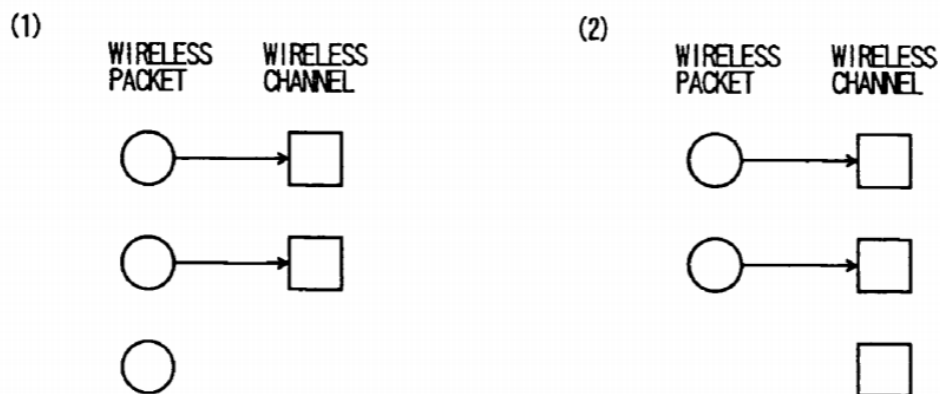
**B. The ’551 Avoids Power Leakage By Preventing Transmission Based on a “Mandatory Channel”**

The ’551 Patent addresses the impact on throughput by *preventing* transmission under circumstances that are likely to lead to leakage. *See* ’551 Patent at 3:33-35 (“It is an object of the present invention to **avoid** leakage power from affecting an adjacent channel **so as to improve throughput by simultaneous transmission.**”). Specifically, the ’551 Patent *changes* the way in which *the decision to transmit* is made in multichannel systems—rather than simply transmitting on a channel based on its idle state, as in the prior art, the ’551 further limits transmission based on the idle state of a “mandatory channel.” Geier at ¶57.

The ’551 teaches that, in conventional multichannel systems, transmission is performed using however many channels are found to be idle at a time. Geier at ¶58; *see also* ’551 Patent at 1:43-47 (“when multiple wireless channels are found

idle by carrier sense, a plurality of wireless packets are transmitted simultaneously by using the wireless channels.”). For example, “FIG. 13(1) shows a case where two wireless channels are idle for three wireless packets. Two of the three wireless packets are transmitted simultaneously by using the two wireless channels.” *Id.* at 1:50-52, Fig. 13(below). Thus, in a conventional multichannel system, each channel is sensed and transmission on a particular channel depends on its *own* idle state. Geier at ¶58; *e.g.*, EX2027 at 1403 (describing a “multichannel variation of the basic CSMA/CA...protocol used with the IEEE 802.11 standard,” wherein “[e]ach node monitors the N channels continuously,” and transmits using a channel on “the first channel to be IDLE”).

FIG. 13



Unlike conventional systems, the '551 Patent changes the way the decision to transmit is made by tying this decision to the state of a “mandatory channel,”

which is one of the channels in a multichannel system. *E.g.*, '551 Patent at 3:50-57. It may be assumed that leakage can affect the channels associated with this “mandatory channel.” *E.g.*, *id.* at 5:57-61. Transmission is limited to “**only** when the mandatory channel” is idle, **even if** other channels may be available. *E.g.*, cl. 1. Thus, when the “mandatory channel” is not idle, transmission would be **prevented** altogether. *See id.*; Geier Decl. at ¶59.

For example, as illustrated in Figs. 1 and 2 (below), wireless channels 1, 2 and 3 are provided for simultaneous use, as in a multichannel system. *See id.* at 6:8-11. At step S2, the method shown in Fig. 1 uses carrier sensing to search for idle channels. At this time, “it is found that the wireless channel #3 is busy at a timing data is generated (1), and the wireless channels #1 and #2 are idle.” *Id.* at 5:64-66. **After this**, at a distinct step S3, “it is determined whether or not the mandatory channel is idle.” *Id.* at 5:64-66. In this case, since idle channel #1 has been set as the “mandatory channel,” “the wireless packets [are] simultaneously transmitted by using two wireless channels as the wireless channels #1 and #2” in step S4. *Id.* 6:8-11.



FIG. 1

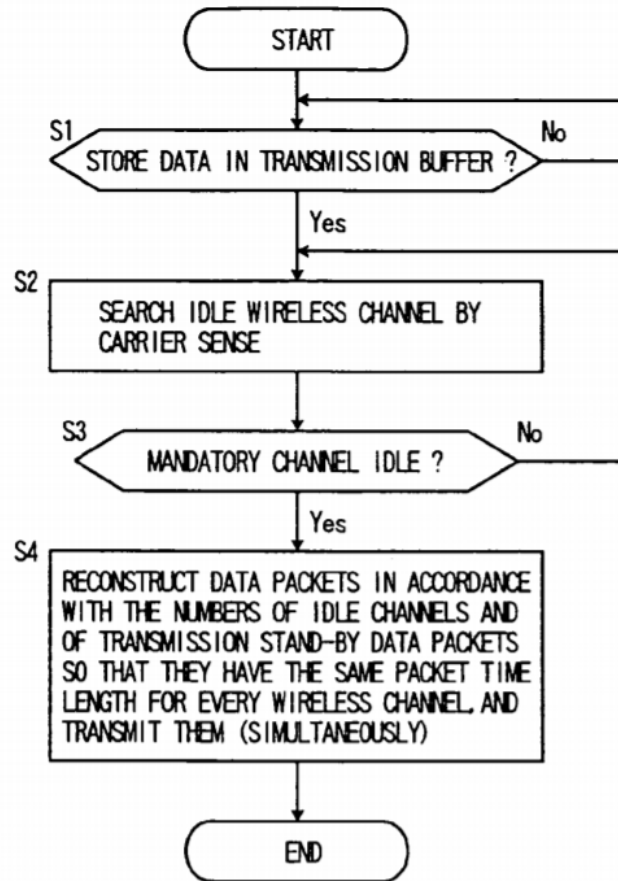
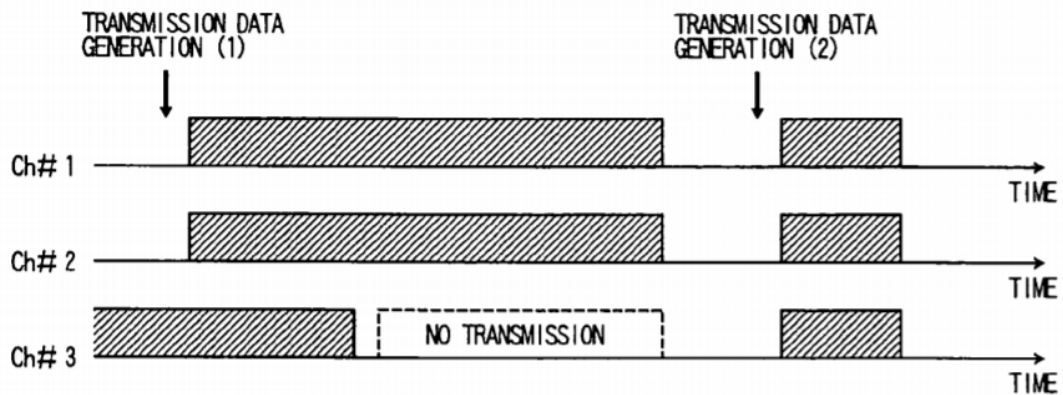


FIG. 2



Notably, “[w]hen the mandatory channel is busy, a procedure goes back to the search of an idle wireless channel,” and thus no transmission is performed. *Id.* at 5:67-6:2. Thus, for example, “[e]ven when the wireless channel #3 becomes idle, another STA **does not perform transmission** because the wireless channel #1 set as the **mandatory channel is busy.**” *Id.* at 6:33-35; *also* Pet. at 14 (“When Ch#3 subsequently becomes idle, it cannot be used for packet transmission—‘no transmission’—because the mandatory channel—i.e., Ch#1—is not also idle.”). Thus, setting a “mandatory channel” can help *avoid* a situation where ACK packets are not received, by *preventing transmission* when power leakage is expected to be a problem. Geier at ¶61, citing e.g., ’551 Patent at 11:67-12:6 (“Thus, it is possible **to avoid a situation** that the transmit-side STA cannot receive a wireless packet addressed to an own STA...Thus, throughput can be improved.”). Petitioner’s expert agrees that the ’551 avoids power leakage by preventing transmission. *E.g.*, Williams<sup>2</sup> at 7:12-18 (Q: “...Is it fair to say that the method shown in figures 1 and 2 of the patent results **in preventing transmission to otherwise idle channels** when the mandatory channel, i.e., channel 3, is not idle?” A: “**From the same transmitter that’s true.**”), 8:3-8 (“In this example, channels 1 and 2 may be used by other stations. And so **the ability to prevent transmission** on channels 1 and 2 by inquiring whether channel 3 is idle or busy

**allows for – for prevention of interference** by some other transmitter talking to another station.”).

The claims clearly refer to these aspects of the “mandatory channel.” *See e.g.*, cl. 1; Geier at ¶62. Specifically, the claims require “setting a mandatory channel that is always used for transmission,” while allowing transmission “*only* when the mandatory channel is idle,” “using a wireless channel/wireless channels that includes/include the mandatory channel.” *E.g.*, cl. 1. Thus, because the “mandatory channel” must be used if any transmission is to occur at all, and transmission is explicitly limited to times “*only* when the mandatory channel is idle,” then no transmission can be performed when the “mandatory channel” is busy even if other channels might be idle. *See id.*; Geier at ¶62.

### III. CLAIM CONSTRUCTION

The Board preliminarily construed certain terms of the ’551 Patent’s claims. DI at 15-22. The Board determined that, for the purposes of this proceeding, only the claim term “mandatory channel” need be construed, as follows: “one channel in a wireless multichannel communication system **over which transmission must occur before transmission** over the other wireless channels.” *Id.* at 21. NTT agrees with the multichannel aspect of the construction, but proposes a modification to the bolded language: “one channel in a wireless multichannel communication system **whose idle state determines whether there can be a**

**transmission** over the other channels.” This language better reflects the intrinsic record because there is no support for transmitting on the “mandatory channel” **“before”** transmitting on other channels.

**A. “Mandatory Channel” Is “One channel in a wireless *multichannel* communication system”**

**1. Claim language supports “multichannel” construction**

The claim language clearly supports the Board’s conclusion that the “mandatory channel” is “one channel in a wireless multichannel communication system.” NTT agrees that “the claim language means ‘there is nothing ‘mandatory’ about a channel if it is the only channel provided.’” DI at 20; *also* Geier at ¶65. Indeed, the use of the qualifier “mandatory” necessarily indicates the possibility of a “non-mandatory” channel, just as requiring that the mandatory channel “always” be used indicates that, absent this language, another channel might be used. *E.g.*, ’551 Patent at cl. 1. Moreover, if 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.” ’551 Patent at cl. 1; Geier at ¶65.

Moreover, the ’551 specification deliberately uses different language to describe identification of a single channel for use in “conventional” systems—“*a*

**wireless channel** to be used **is determined** in advance.” *Id.* at 1:24-26. Although 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.” Geier at ¶¶50, 66. Thus, that the claims deliberately describe “setting a mandatory channel” in different terms than used to describe conventional systems likewise indicates that the invention does not relate to single-channel systems. *Id.* at ¶66.

The dependent claims provide further support for the “mandatory channel” being one of multiple channels in a multichannel system. For example, dependent claim 4’s requirement of an ability to “selectively [use] the multiple wireless channels or the MIMO” further confirms that, while the method of independent claim 1 may be performed using a single channel with MIMO transmission, it remains possible to use “multiple wireless channels” instead. *See id.* at ¶67.

By contrast, Petitioner’s interpretation that the “mandatory channel” can apply to a single-channel system would render the claim language a nullity—if only a single channel were provided at the outset, there would be no need to “set” a “mandatory channel,” nor require that transmission occur “**only** when the mandatory channel is idle.” *See* ’551 Patent at cl. 1.

**2. The specification supports the “multichannel” construction**

NTT agrees with the Board that the claims must be interpreted in view of the specification, including the purpose of the invention. *See* DI at 19; *also Netcraft Corp. v. eBay, Inc.*, 549 F.3d 1394, 1396–97 (Fed. Cir. 2008) (POSA “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.**”). Here, the specification clearly supports the “multichannel” aspect of the Board’s construction. Indeed, as discussed above in §II.A, the specification teaches that the problem addressed by the ’551 arises specifically in the context of multichannel systems—*i.e.*, that power leakage “where center frequencies of multiple wireless channels used at the same time are close to each other” negatively impact the throughput gains of simultaneous transmission. ’551 Patent at 2:26-30. Further, the specification teaches that the solution is to prevent transmission on otherwise idle channels based on the state of the “mandatory channel,” which is “a wireless channel having the highest priority *among wireless channels* that have a plurality of priorities.” *Id.* at 3:57-60.

In fact, in *every* embodiment, a “mandatory channel” is identified from *one of multiple* available channels provided between a transmitting and receiving station (STA). *E.g.*, ’551 Patent, at 5:52-57 (“In this embodiment, wireless channels #1, #2, and #3 are provided, and the wireless channel #1 is set as a

mandatory channel.”); 7:8-12 (“In this example... simultaneous transmission is performed using two wireless channels as the wireless channels #1 and #2 because . . . #1 set as the mandatory channel is idle.”). Nothing in the specification suggests that a “mandatory channel” can be the only channel assigned to a given user.

### 3. Prosecution history supports “multichannel” construction

The prosecution history of the ’551 Patent likewise supports the multichannel aspect of the Board’s construction.

Both the applicant and examiner clearly regarded the ’551 patent as pertaining to multichannel systems. In fact, the examiner *only* cited references that disclosed multichannel systems: Mousley, for instance, disclosed transmitting packets “using **multiple** wireless channels,” but “**does not disclose** determination of an idle channel...**and setting a mandatory channel.**” EX1002 at 306; also DI at 17 (noting “arguments made during prosecution where the claim language reciting ‘setting a mandatory channel’ was pointed out as distinguishing over the prior art”). Sonetaka disclosed assigning a “service channel” out of *multiple* channels provided, to carry traffic of a predetermined traffic rank. *Id.* at 306-307. While the applicant pointed out that Sonetaka’s “service channel” was not “regularly used,” it never objected to its relevance as a multichannel reference. *See id.* The applicant also characterized the claimed “mandatory channel” as being

“indispensable,” which indicates the possibility that other channels are “dispensable” by comparison. *Id.* at 307.

The issue of whether a “mandatory channel” can be the sole channel provided simply never came up—rather, both applicant and examiner accepted as a given that the “mandatory channel” must be one of multiple provided channels.

**B. “Mandatory” Status is Based on Idle State, Not Timing for Transmission**

The only modification that NTT proposes is to the bolded language of the Board’s preliminary construction, specifying that “transmission must occur [on the mandatory channel] **before transmission may occur** over the other wireless channels.” This language suggests that there is a preference for the “mandatory channel” in terms of *when* transmission can occur. However, neither the specification nor the claim language supports distinguishing the “mandatory channel” based on timing of transmission. Instead, the “mandatory channel” is distinguishable based on the special status accorded to its idle state, over and above that of other channels in a multichannel system. Thus, NTT proposes the following modification: “one channel in a wireless multichannel communication system **whose idle state determines whether there can be a transmission** over the other channels.” This modification is consistent with the Board’s finding that “the purpose of the ’551 patent is to transmit 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.**” DI at 19 (emphasis in original).

For example, as discussed in §II.B, Figs. 1 and 2 show that, prior to transmission, carrier-sensing is used to identify *all* channels that are idle. Once idle channels are identified, a subsequent step is used to check whether the “mandatory channel” is idle. Assuming that the “mandatory channel” is idle, transmission is performed *simultaneously* on all idle channels including the “mandatory channel.” Indeed, as shown in Fig. 1, it is not until step S4—*after* determining which channels are idle (S2) *and* that the mandatory channel is idle (S3)—that the system proceeds to transmit on all idle channels “simultaneously.” No language suggests there must be a transmission on the “mandatory channel” *before* other channels. Geier at ¶74. Petitioner’s expert agrees with this interpretation. *E.g.*, Williams<sup>1</sup> at 29:24-30:7 (“[I]f you look back at the [’551] patent on figure 2, **you see that [the Board’s] construction is at odds with figure 2 of the patent where there are two channels that are transmitting simultaneously** after the mandatory channel has been tested to be idle and found to be idle. **So there’s no...temporal difference** between transmissions on channel 1 [the mandatory channel of Fig. 1] and channel 2.”). Further, there is no language

in the claims themselves suggesting a time-based preference for transmitting on the “mandatory channel.” Geier at ¶74.

Instead, the intrinsic record teaches that the “mandatory channel” is distinguishable over other channels in a multichannel system because its *idle state* determines whether a transmission can occur. *E.g.*, ’551 Patent at 3:56-60 (“**when the mandatory channel is busy, transmission is not performed** even if there is another wireless channel. In other words, the mandatory channel can be regarded as a wireless channel having the **highest priority** among wireless channels”). The claims themselves emphasize the “mandatory channel’s” idle state—*i.e.*, a transmission can occur “**only** when the mandatory channel is *idle*.” *E.g.*, cl. 1. Further, the specification teaches that “[w]hen the mandatory channel is busy, each STA does not perform transmission *even if there is another idle wireless channel*.” *Id.* at 3:56-57; 3:57-60. Thus, the “mandatory channel” is identifiable as such because *its idle state* determines whether a transmission occurs in a multichannel system, *regardless* of whether other channels are idle. Geier at ¶¶74-75; *also* Williams<sup>1</sup> at 28:25-29:11 (“[T]he patent makes clear and the claims make clear that there’s...*a test to be made of the idle nature of the mandatory channel, and then a decision to transmit based on that mandatory channel being idle*. The—if the mandatory channel is occupied, then there will be no transmissions...”). This is consistent with the stated purpose and solution

proposed by the '551 Patent, which is to *prevent transmissions* on otherwise idle channels under circumstances in which leakage will likely occur. Geier at ¶75; DI at 12-15.

Thus, NTT respectfully urges that the Board modify its preliminary construction to be more accurate: “one channel in a wireless multichannel communication system **whose idle state determines whether there can be a transmission** over the other channels.”

#### **IV. PETITIONER FAILS TO DEMONSTRATE THAT ANY CLAIM IS UNPATENTABLE UNDER GROUND 2 (SHPAK-LUNDBY): CLAIMS 1, 3-5, 7-8**

In the Decision on Institution, the Board determined, based solely on the record presented at that time, that one or more claims of the '551 Patent may be unpatentable over the combination of Shpak and Lundby (Ground 2, “Shpak-Lundby”). DI at 30. The Board further instituted review of the remaining grounds based upon its conclusion as to Shpak-Lundby. *Id.* at 35, 41, 42. As such, NTT addresses Ground 2 first.

As discussed below, Shpak-Lundby fails to disclose the claimed “mandatory channel,” and fails to disclose the step of “transmitting...only when the mandatory channel is idle,” and thus cannot render any challenged claim unpatentable. Specifically, unlike the '551 Patent, Lundby does not provide any methods for *preventing* transmission based on the status of one of multiple channels in a

multichannel system—rather, the *only* decision of Lundby is whether to transmit over one channel or two. *See* DI at 25. This is unsurprising considering that Lundby makes no mention of the problem of power leakage between channels with distinct center frequencies, nor describes any means of addressing leakage. Geier at ¶78. Shpak cannot fill this gap as it only describes a single-channel system, with no indication of how the decision to transmit would be handled in a multichannel system. There is therefore no teaching or suggestion in the combination of Shpak-Lundby that would lead a POSA to either (i) set a “mandatory channel,” whose idle state determines whether there can be any transmission at all, nor (ii) limit transmissions to times *only* when the mandatory channel is idle.

**A. Shpak**

NTT agrees with the Board’s analysis of Shpak—this reference only teaches transmission over a single channel, *i.e.*, a “common frequency channel.” DI at 24. NTT otherwise generally relies on the description of Shpak provided in the Petition, with the following additions to the record:

Petitioner’s expert admits that there is no explicit disclosure of multiple channels in Shpak. Williams<sup>2</sup> at 71:12-18 (Q: “...Is there any discussion of these multiple channels in Shpak itself?” A: “I don’t see an explicit disclosure of multiple—multiple channels, but I don’t see a preclusion of it.”). Rather, Shpak teaches only that standardized methods of carrier-sensing apply to its “common

frequency channel.” Shpak at ¶¶5, 33. At the time of Shpak, the 802.11 standards did not address multichannel systems.<sup>3</sup> Geier at ¶79, 81.

Thus, there is no disclosure in Shpak regarding how carrier-sensing may function in a *multichannel* system, much less how the decision to transmit would be made. *See id.*; Geier at ¶81. There is likewise no disclosure relating to the problem of power leakage between channels with different center frequencies. *Id.*

## **B. Lundby**

Lundby describes a method for “improving the transmission of information signals” by first and second communication links. EX1008 at Abstract. Two aspects of Lundby are particularly significant for understanding its scope:

**First**, Lundby only describes code channels that occupy *the same frequency channel*. As such, Lundby neither describes nor addresses the problem of power leakage “where center frequencies of multiple wireless channels used at the same time are close to each other.” Geier at ¶83, *citing* ’551 Patent at 2:26-28.

**Second**, as Petitioner acknowledges, Lundby’s methods only “determine whether to transmit the signals over one channel (a primary channel) or two (primary and secondary channels).” Pet. at 39; also Williams Decl. at ¶120.

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<sup>3</sup> Dr. Williams concedes that the 802.11 standards at the time of Shpak did not include carrier sense (busy/idle determination) capabilities for multiple channels. Williams2 at 72:21-25.

Critically, Lundby *does not* address the decision of whether to transmit or not—rather, as Petitioner’s expert Dr. Williams *repeatedly* emphasized, “**there’s no determination of whether to transmit disclosed by Lundby.**” *E.g.*, Williams<sup>2</sup> at 27:17-19.

**1. Lundby Addresses Signal-to-Noise of Code Channels Within the *Same* Frequency Channel**

Unlike the ’551 Patent, which pertains to CSMA-based systems, Lundby addresses the usage of code-based channels that occupy a single frequency channel as in a CDMA system. Geier at ¶85. Since Lundby focuses on code channels, it does not disclose, or address, interference between distinct frequency channels. *Id.*

An overview of CDMA and CSMA-based access is provided in the Geier Declaration. Geier at ¶¶88-92. In short, in CDMA systems, each user is assigned a different *code*. *Id.* at ¶88. Receivers of a transmission are able to use this code to retrieve transmissions. *Id.* at ¶88, *citing* EX2010 at 849, EX2008 at 126. CDMA may also be conceptualized as providing distinct “code-channels,” but as a practical matter, CDMA is in fact a method for sharing access to a single channel. Geier at ¶88.

Lundby’s CDMA system uses Walsh codes to create “primary” and “secondary” code channels that occupy the same frequency band, such as the forward link channel used in cellular systems. EX1008 at 2:8-11 (“In a CDMA

system, one could double the effective bandwidth **on the forward link** by halving the length of the Walsh codes used for orthogonally spreading the encoded bit stream.”), 6:42-45 (“...performing signal transmission in this manner requires a base station to use **two Walsh codes** rather than one, because two channels are being used instead of one.”), 15:46-78; *also* EX2024 (“Williams1”) at 11:9-15 (Q:...[A]re those specific channels in the preferred embodiment **distinct frequency ranges**? A: **No**. They’re CDMA-based separation between the channels in the primary embodiment.); 10:12-15. It is possible for a system to run out of orthogonal Walsh codes, *which* Lundby describes as being “code-limited.” EX1008 at 2:20-23; EX2028 at 147; EX2032 at 2:62-3:7.

Due to their orthogonality, Walsh codes inherently eliminate interference between distinct code channels. Geier at ¶94; EX2029; Williams1 at 171:7-10 (“Separating channels, not the channels described by the ’551 Patent, by codes **does not have a power leakage issue**. Separating those channels by codes has a code limiting interference.”). *If* codes are not sufficiently orthogonal, signals may be degraded by noise from other users, referred to as “co-channel interference” because it occurs on the *same* frequency channel. Geier at ¶94; EX2030 (cited in Lundby) at 1:25-29 (“Since the *same wide bandwidth* is available to all users, information signals in other channels may appear as *co-channel interference* or noise when the received signal is demodulated by the spreading code.”). Co-

channel interference is unlike interference caused by power-leakage across distinct frequency channels because it is, by definition, within the same channel. Geier at ¶94; EX2031. Thus, while Lundby discusses issues relating to signal-to-noise ( $E_b/N_0$ ) pertaining to the forward link, this is properly viewed as co-channel interference within *the same communication link* rather than as interference from distinct frequency channels with distinct center frequencies. Geier at ¶94; EX1008 at 1:11-14 (“The quality of *a communication link* over a noisy channel depends on the energy to interference noise ratio  $E_b/N_0$  of the signal. To achieve a required bit error rate over *the communication link*, a particular  $E_b/N_0$  is required.”). Lundby’s solution for co-channel interference is to use sufficiently orthogonal codes, so that transmission can occur on the same forward link even though this channel is not idle. Geier at ¶94.

CDMA systems do involve distinct frequency bands, in the form of duplexing. Typical CDMA systems employ both a forward link for a base station to transmit information to users, as well as a reverse link for users to transmit to a base station. Geier at ¶95; EX2030 at 1:49-2:11. However, Lundby is silent on the possibility of interference between distinct frequency channels and how such interference might be addressed. Geier at ¶95.



**2. Lundby Neither Addresses the Decision to Transmit Nor Prevents Transmission**

As Petitioner concedes, Lundby provides a method to “determine whether to transmit the signals over one channel (a primary channel) or two (primary and secondary channels).” Pet. at 39; also Williams Decl. at ¶120. However, Lundby *does not* address the decision of whether to transmit or not. *Id.* Indeed, as Petitioner’s expert Dr. Williams *repeatedly* emphasized, “there’s no determination of whether to transmit disclosed by Lundby.” *E.g.*, Williams2 at 27:17-19; 44:20-23 (“In other words, Lundby, as we discussed before, is post the decision to transmit.”). As such, Lundby’s methods do not prevent transmission. Geier at ¶96.

The method shown in Fig. 2 (below) illustrates Lundby’s teachings. *See e.g.*, Williams Decl. at ¶¶140, 142.

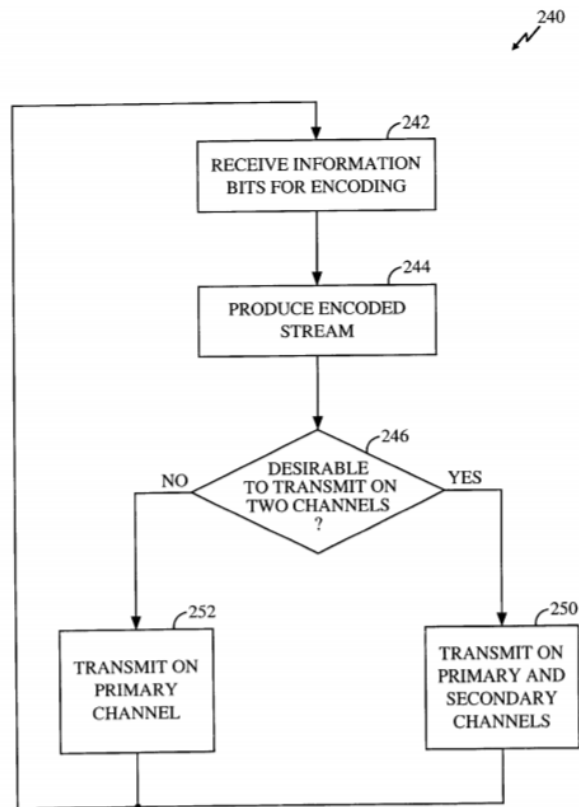


FIG. 2

At decision 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.**” EX1008 at 4:26-30. Thus, Lundby *only* illustrates two outcomes—transmitting on the primary channel or on both the primary and secondary channels. Geier at ¶98; Williams Decl. at ¶142. Lundby’s decision tree does not include any situation where transmission is *prevented*. *Id.*

In fact, Petitioner’s expert *repeatedly* acknowledges that Lundby’s methods do not affect the decision to transmit at all. For instance, Dr. Williams admits that

Lundby's methods *presume* that a transmission will take place, because Fig. 2 does not come into play until *after* a positive decision has been made. *E.g.*, Williams2 at 47:12-15 ("And the use of the decision tree from Lundby, figure 2, does not include the decision to transmit or not. **The decision's already been made**—been made to transmit in Lundby figure 2."); 45:16-18; Geier at ¶99.

As such, Lundby does not address whether to transmit when, for example, a primary channel code is unavailable, but another code, which might be used for a secondary channel, is available. *See e.g.*, Williams2 at 62:10-13 ("Q: Is there any embodiment described in Lundby that describes a situation where the primary channel is not available? A: Not that I recall."); 62:14-19. Indeed, Lundby does not teach checking the availability of the primary channel at all, as it is always assumed that a primary channel code is available. *E.g.*, *id.* at 61:22-62:4 ("The disclosures in Lundby, again, **don't check whether the primary channel is idle or busy**, as we've discussed in figure 2. The decision at [block] 246, figure 2, is whether there will be a transmission on the primary channel or on the primary channel and secondary channels. And so **there's already been a decision to transmit** before entering figure 2, as we've discussed before."). This is a stark difference from the '551 Patent, which is specifically targeted toward preventing transmission on otherwise available channels when a "mandatory channel" is busy. Geier at ¶100.

As such, Lundby's methods do not teach any means for *preventing* transmission, let alone preventing transmission based on the special status accorded to any particular code channel. Geier at ¶101. Indeed, Lundby does not address or alter the methods by which CDMA systems decide whether to transmit in the first instance. However, it was known that, in general, a transmission may occur if an available CDMA code, such as a Walsh code, is found. Geier at ¶101; *see also* EX1008 at 4:62-67. If any particular Walsh code is unavailable, the system proceeds to generate additional codes, until an available orthogonal code is found. Geier at ¶101; *see also e.g.*, EX2028 at 145-147; EX2032 at 1:38-61, 2:62-3:7. Lundby provides no teachings altering this standard practice, nor suggests that any particular code channel should be preferred over another. Geier at ¶101; Williams<sup>2</sup> at 18:4-13 (Q:...If at the beginning of a transmission, one of these codes must be assigned to Lundby's primary channel, **does Lundby teach or suggest any reason for – to prefer one of these example codes over another?** A: **Not that I recall**, and it has nothing to do with my opinion in this case."). Lundby's "primary channel," therefore, is simply the first available channel that is found. Geier at ¶101.

### C. Shpak-Lundby

According to Petitioner, a POSA would have combined Shpak with Lundby by adding "another available 802.11b channel as a 'secondary channel' to augment

the primary channel's [Shpak's common frequency channel] bandwidth such that wireless packets are transmitted on both channels simultaneously." Pet. at 41-42. Further, Dr. Williams has explained that a "Shpak-Lundby access point would have applied Lundby's decision tree to select which channel(s) to use: (a) the "primary channel" or (b) the primary and secondary channels when desirable." Williams Decl. at ¶140. Petitioner treats Lundby's decision tree shown in Fig. 2 as representative of the method performed by Shpak-Lundby. *See id.* at ¶141.

Specifically, Dr. Williams explained that the Shpak-Lundby process only differs from Lundby's by adding Shpak's step of checking idle status *before* entering Lundby's decision tree of Fig. 2: *E.g.*, Williams2 at 45:7-18 ("Q: Do you have an opinion as to whether figure 2 would be modified to include the teachings of Shpak? A: ...the CCA algorithm inherent in 802.11 checks for the idle nature of the channel before transmissions. **So that checking of – of the decision to transmit or not is – occurs before figure 2 in Lundby.**"), 47:12-23 (".... **So modifying Lundby figure 2 to include a decision to transmit or not would include a block before block 242 in figure 2 of Lundby, which would decide whether to transmit or not. And the teachings of Shpak with regards to 802.11 systems** would teach the determination of the CSMA/CCA state of busy or idle is a process to determine whether the – the channel is busy..."); 49:23-50:1.

Thus, per Dr. Williams, because Lundby itself does not address the decision to transmit, the manner in which that decision is made must come from Shpak. Specifically, with reference to the '551 Patent's Fig. 1, Dr. Williams testified that Shpak allegedly provides *two distinct steps* taught in the '551: “And that disclosure in **Shpak would be equivalent to S3 and S2** in figure [1] of the '551, while the disclosure in Lundby figure 2 is equivalent to S4 in the '551 patent figure [1].” Williams2 at 66:22-25. Steps S2 and S3 of Fig. 1 in the '551 Patent, as discussed in §II.B, determine (i) which channels are idle in the multichannel system, and (ii) whether one of these idle channels is the mandatory channel, and makes the decision to transmit based on its status. It is the '551's addition of this second requirement for limiting transmission that changes the decision to transmit in multichannel systems. Geier at ¶104; §II.B *supra*.

However, Dr. Williams also acknowledges that Shpak by itself does not teach the use of multiple channels or a “mandatory channel” as used in the claims. Williams2 at 53:1-3 (“Through the 802.11 standard, as I discussed before, **Shpak, by itself, doesn't disclose the mandatory channel.**”). Rather, as discussed above, because Shpak only teaches a single-channel system, it only need perform one step—checking if the channel is idle—before transmitting. Geier at ¶105. It is incorrect to say that Shpak discloses two distinct steps of checking first (i) the state

of all provided channels, and (ii) further checking the state of a “mandatory channel.” *Id.*

Indeed, Dr. Williams admits that Shpak’s decision process does not include any teachings addressing a scenario where the “common frequency channel” is busy while a “secondary channel” is idle: *E.g.*, Williams2 at 56:16-18 (“Q: Would the idle state of the secondary channel still be checked? A: I believe **Shpak is silent on that.**”); 58:3-8. Further, as discussed in §IV.B.2, Dr. Williams admits that Lundby also does not teach any scenario in which a primary channel code is unavailable, nor any scenario where the status of the primary channel is checked. Thus, there is no disclosure in either reference of how the decision to transmit would be made in a multichannel Shpak-Lundby system when the alleged “primary channel” (the “common frequency channel”) is busy, but the “secondary channel” is idle. Geier at ¶106. This is in stark contrast to the ’551 Patent, which explicitly teaches changing the decision to transmit on other idle channels when the “mandatory channel” is busy. *Id.*

**D. Shpak-Lundby Cannot Render Any Challenged Claim (1, 3, 4, 5, 7, 8) Unpatentable**

The combination of Shpak and Lundby (“Shpak-Lundby”) cannot render any claim of the ’551 Patent unpatentable. The ’551 Patent, as discussed in §II.B, changes the way in which *the decision to transmit* is made in multichannel

systems, by adding a further requirement that transmission be limited to times “only when the mandatory channel is idle.” Neither Shpak nor Lundby, however, provide any teachings to modify the decision to transmit in multichannel systems. Further, none of Petitioner’s alleged motivations for combining Shpak with Lundby provide any reason to change the way in which the decision to transmit is made. As such, Shpak-Lundby fails to teach the claimed “mandatory channel” and step of transmitting “only when the mandatory channel is idle.”

**1. Shpak-Lundby Does not Prevent Transmission when the “Common Frequency Channel” is Busy**

Patent Owner agrees with the Board’s conclusion that “the purpose of the ’551 patent is to transmit 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.**’” DI at 19 (emphasis in original). This, in fact, is the point of the claimed step limiting transmission to times “**only** when the mandatory channel is idle.” Geier at ¶108. The combination of Shpak-Lundby, however, does not limit transmission in this manner. *Id.*

As discussed in §§IV.A-C, there is no disclosure in either Shpak or Lundby of how the decision to transmit is made in the alleged Shpak-Lundby multichannel system, when the “common frequency channel” (the purported “primary channel”) is busy but a “secondary channel” is idle. Indeed, Petitioner’s expert Dr. Williams



**repeatedly** emphasized that Lundby provides no teachings with respect to how the decision to transmit is made—rather, Lundby only addresses whether another channel may be used *after* a decision to transmit. Shpak does not fill this gap because Shpak only addresses single-channel systems, and as such provides no teachings for how the decision to transmit is made in a multichannel system at all, let alone suggests that one channel should be prioritized over another. Rather, all that Shpak teaches is that, consistent with basic operation of CSMA in 802.11, if a channel is detected to be idle, then transmission occurs. EX1005 at ¶5; Geier at ¶109.

In the absence of any teaching modifying the decision to transmit based on a special status accorded to one channel in a multichannel system, a POSA would understand that the default is to transmit whenever a channel is available, as is consistent with Shpak and legacy 802.11 systems. Geier at ¶110. Indeed, the ’551 specification teaches that that is the case in prior multichannel systems—*i.e.*, the straightforward application of carrier-sensing to a multichannel setting is simply to sense multiple channels instead of just one, and transmitting on channel(s) sensed to be idle. *Id.* (citing ’551 Patent at 1:43-2:3; *also* EX1007 at ¶¶40-41, 44; EX2027 at 1403). Shpak provides no teachings to the contrary, as Petitioner’s expert confirmed. Williams<sup>2</sup> at 75:16-20 (“In paragraph 5 [of Shpak], the author’s pointing to 802.11 process of CCA to determine whether to transmit or not and

doesn't restrict that determination to the common [frequency] channel.”). In other words, in CSMA-based multichannel systems, transmission is performed on a channel *based on that channel's own idle state*. Geier at ¶110; EX2027, §II.B. CDMA systems are no different in this regard. As is known in the art, if a first code channel is unavailable, the system simply proceeds to generate new codes until an available code is found, and then transmission is performed.<sup>4</sup> Geier at ¶110; §IV.B.2 *supra*. There is no reason to avoid usage of an available code based on a prior attempted code being unavailable. *See id.* Lundby provides no teachings to address or modify the manner in which its “primary channel” is assigned. Geier at ¶110. Thus, in both CSMA and CDMA systems, whether a transmission occurs on a given channel is based only on that channel's *own* availability, not the status of another channel. *Id.*

Petitioner is expected to argue that transmission is prevented, or delayed, in Shpak-Lundby purely by implication—*i.e.*, as Dr. Williams testified, “in my opinion, a POSITA reading Lundby would understand that Lundby controls the transmission facility of the second channel due to system architecture,” and thus this implies that the transmission over the second channel cannot occur absent the

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<sup>4</sup> Petitioner's expert treats code availability as being analogous to idle state of a frequency channel. *See Williams2* at 60:25-61:4 (“That availability of the code to allocate to the secondary channel is a determination of whether the secondary channel is idle or busy in this particular embodiment in Lundby.”)

primary channel being idle. *See id.* at ¶111. However, this directly contradicts Dr. Williams' ***repeated*** assertions that Lundby does not address the decision to transmit, because Lundby's process does not come into play until ***after the decision to transmit has already been made***. Williams<sup>2</sup> at 26:18-21, 27:15-21, 44:20-23, 47:12-15, 49:17-22, 50:20-22, 62:2-4, 63:9-12, 66:17-18, 80:25-81:1, 83:15-18, 84:15-16; §IV.B.2, IV.C *supra*. Indeed, Lundby's methods do not show how transmission might be ***prevented*** under any scenario—rather, as discussed above, every single embodiment in Lundby presumes that at least one channel will be used, because Lundby only teaches how to add a channel to an existing available channel. Geier at ¶111, §IV.B *supra*. It is illogical to say that Lundby's methods prevent transmission at the same time as assuming that a transmission will occur. Geier at ¶111.

Thus, even though Lundby teaches that a secondary channel may be checked ***assuming a primary channel code is available***, this does not mean that Lundby would prevent transmission altogether where at least one code was available. Geier at ¶112. Rather, given that Lundby is entirely silent on this scenario, a POSA would reasonably assume that Lundby's CDMA systems operate no differently from conventional CDMA systems, in that additional codes will be generated/attempted until an available one is found. *Id.* Since Lundby does not address the decision to transmit, it follows that Lundby does not prevent a system

from simply finding the next available code, and then transmitting using that code. *Id.* The only difference is that, since Lundby's method does not begin until *after* an available code is found, this available code would be treated as a "primary channel" within Lundby's Fig. 2. *Id.* In other words, Lundby does not change the decision to transmit based on a special status of one channel, because Lundby does not teach any means for preferring one code channel over another in assigning a "primary" channel. *Id.* at ¶112; also Williams<sup>2</sup> at 18:8-13 ("Q: ...[D]oes Lundby teach or suggest any reason for—to prefer one of these example codes over another? A: Not that I recall, and it has nothing to do with my opinion in this case."). Lundby's Fig. 2 may use the label "primary channel," but there is no indication in Lundby that the assignment of this name reflects anything other than that this happens to be the *first available* channel. Geier at ¶112. Thus, Lundby itself provides no reason why *either* channel in Shpak-Lundby (whether the "common frequency channel" or otherwise) cannot serve as a "primary channel" in the steps of Fig. 2, so long as it is available. *Id.*

Indeed, even Petitioner's expert cannot point to anything *in Shpak-Lundby* tying the decision to use one channel to the idle state of another without reference to the '551 Patent. Tellingly, when asked whether the state of the secondary channel would be considered in the decision to transmit in the event the primary channel is unavailable, Petitioner's expert repeatedly referred to **the '551 Patent**:

*E.g.*, Williams2 at 50:23-51:4 (“Q: Would the secondary channel be checked in this decision tree [from Fig. 2 of Lundby], as modified by Shpak? A: It’s not necessary to check the nature of the secondary channel, ***according to the ’551 patent.***”), 58:3-18 (“Q:..Would—in the combination you’ve described, would the idle state of the secondary channel be checked? A: So as I’ve testified before, Shpak is silent on that...***And the claim [of the ’551 Patent]*** doesn’t require determining if the secondary channel is idle or busy.”). This is textbook hindsight: it is plainly improper to use the teachings of the ’551 Patent to supply that which the prior art does not. The fact that Petitioner’s expert relies so heavily on the ’551 Patent to provide a roadmap for how to combine Shpak with Lundby (*e.g.*, Williams2 at 26:12-21, 27:7-9, 46:19-47:15, 48:19-23, 50:23-51:15, 63:9-12, 65:24-66:5, 66:17-25, 67:24-68:1, 69:8-11, 85:10-18) confirms that these references simply do not disclose the ’551’s invention.

Thus, in Shpak-Lundby, there is no teaching to suggest that the idle state of a second frequency channel in a multichannel system would not be checked if the first channel were busy, nor that the status of one channel in a multichannel system should play a special role in deciding whether to transmit. Geier at ¶114. Rather, both Shpak and Lundby suggest that transmission would occur so long as one channel is idle. *Id.*

**2. Petitioner Fails to Allege Any Motivation to Modify the Decision to Transmit**

Petitioner fails to allege any motivation for a POSA to implement the alleged Shpak-Lundby combination in such a way as to prevent transmission on an otherwise available channel, based on the status of another channel.

First, there is no motivation in the references themselves to modify the decision to transmit in a multichannel system. Shpak, as discussed, cannot supply such a motivation because Shpak only relates to single-channel systems. Geier at ¶116. Further, Shpak provides no disclosure of problems relevant to multichannel systems, such as power leakage. *Id.*; §IV.A. Lundby also does not provide any such motivation, at least because Lundby always presumes that a transmission will occur. *Id.*, §IV.B.2 *supra*. Moreover, as discussed above in §IV.B, Lundby does not describe the problem of power leakage between channels “where center frequencies are close,” as in the ’551 Patent. Rather, Lundby only addresses *co-channel* interference occurring on *the same* frequency range. *Id.* Lundby does not describe or address interference caused by power leaking from one channel into another because Lundby’s orthogonal code channels, by definition, already prevent such interference. *Id.* Petitioner’s expert has confirmed this understanding. *See* Williams<sup>1</sup> at 171:7-10. As such, Lundby provides no motivation to tie the use of

one available channel based on a busy status sensed in another channel. Geier at ¶116.

Petitioner may try to argue that Lundby does address prevention of transmission, as its expert suggested, in col. 2, lines 45-49. Williams2 at 83:15-84:1. Such an argument fails for at least two reasons: First, this portion of Lundby merely addresses *prior* known circumstances where limits on transmit power may prevent transmission. Thus, this circumstance is not part of “Lundby’s decision tree.” Second, as Dr. Williams acknowledged, this portion of Lundby describes the problem of being power-limited, *i.e.*, the amount of power transmissible *by a given base station*. Williams2 at 86:17-20 (“So even if there are additional spread codes available, you’re limited by the amount of power that can be transmitted **by the base station**.”). This issue applies equally *to all code channels*, however, and as such does not address whether the state of any *particular* channel should affect the use of another. Geier at ¶117; also Williams2 at 88:6-14 (“Q: So in column 2...this is asking whether a code is available in transmission being allowed, is it not? . . . A: No...This is limiting the transmit power of the base station.”), 88:24-89:5 (Q: But the power limited situation would apply to all the codes; is that – is that correct?...A: Yes. True.). Thus, power limits still would not motivate a POSA to prevent transmission on otherwise available channels based on the busy state of one channel. Geier at ¶117.

Petitioner's alternative motivations to combine Shpak-Lundby likewise cannot motivate a POSA to alter the decision to transmit, because these motivations only address the advantage of using two channels as opposed to one. None of Petitioner's alleged motivations suggest there may be circumstances where transmission should be prevented altogether based on the status of one channel in a multichannel system.

For example, Petitioner's first alleged motivation to combine Shpak with Lundby is to increase transmission speed. Pet. at 42; Williams Decl. at ¶126. At most, this motivation 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. Geier at ¶119. To the contrary, this motivation would suggest that transmission should proceed whenever a channel is idle. *Id.*

Petitioner has also alleged that a POSA would wish to combine Shpak with Lundby because adding an additional channel to Shpak's "common frequency channel" would reduce interference on the "common frequency channel." Pet. at 42; Williams Decl. at ¶127. However, this motivation does not suggest any scenario where one would wish to prevent transmissions on available channels in a multichannel system, based on the state of one particular channel. Geier at ¶120. As with increased speed, this motivation at most speaks to the advantages of using two channels instead of one, but does not suggest one might wish to use *none*. *Id.*



Petitioner has also suggested that a POSA would wish to use another channel to reduce the amount of transmit power on Shpak's "common frequency channel," so as to stay within regulatory limits. This motivation at most provides a reason to use two channels instead of one, but does not suggest any reason why a POSA would wish to prevent transmission altogether based on the status of one channel. Geier at ¶121.

Petitioner has also suggested that a POSA would be motivated to add a second channel as it is allegedly one of a number of finite solutions and may be implemented using known techniques, citing 802.11. Pet. at 43-44. However, these purported motivations likewise suggest that using two channels rather than one may be advantageous, but do not explain why transmission should be prevented altogether when any channel in a multichannel system is available. Geier at ¶122.

### **3. Claim 1**

#### **(a) [1A] setting a mandatory channel that is always used for transmission;**

Shpak-Lundby fails to disclose this step for at least the following reasons:

**First**, as discussed in §III.B, a proper construction of the claimed "mandatory channel" is "one channel in a wireless multichannel communication system **whose idle state determines whether there can be a transmission** over

the other channels.” Shpak itself does not teach this because Shpak does not disclose a multichannel system. Geier at ¶124; Williams2 at 53:1-3. Nor, indeed, does Shpak disclose the claimed “mandatory channel” when combined with Lundby. Per Petitioner, the combination of Shpak-Lundby includes two channels because another frequency channel has been added to Shpak’s “common frequency channel,” which is allegedly the claimed “mandatory channel.” However, as discussed above, there is nothing in either Shpak or Lundby that prevents transmission on a given idle channel based on the status of another channel (§§IV.A-C, IV.D.1-2), and thus Shpak-Lundby does not disclose a mandatory channel “whose idle state determines whether there can be a transmission.” Geier at ¶124. Indeed, Shpak provides no suggestion that carrier-sensing should operate differently in a multichannel system, nor that any one channel in a multichannel system should be accorded special status. *Id.*; §IV.A. Thus, given that Petitioner’s expert contends that *Shpak* provides the method for deciding to transmit (Williams2 at 41:12-19, 45:13-23, 47:3-24, §IV.C *supra*), there is no reason to assume that both channels in Shpak-Lundby would not be considered, nor any reason to assume that an otherwise idle “secondary channel” would not be used simply because Shpak’s “common frequency channel” is busy. Geier at ¶124; *see* Williams2 at 75:16-20 (determination of idle state not limited to common channel); §IV.C, §II.B (describing prior art methods of sensing all available channels).

Lundby provides no teachings to the contrary. Per Petitioner’s expert, Lundby’s process does not even come into play until *after* the decision to transmit has already been made. *See* §§IV.B.2, C, D.1 *supra*. Thus, Lundby does not speak to how the decision to transmit is made, much less suggest that the idle state of one channel should be prioritized as part of that decision. Geier at ¶111, §§IV.B.2, D.1. Indeed, as Petitioner’s expert admits, Lundby does not teach checking the status of its “primary” channel at all. Williams2 at 61:22-24 (“The disclosures in Lundby, again, don’t check whether the primary channel is idle or busy.”). Rather, 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. Geier at ¶125, §IV.B.2. Thus, Lundby does not provide any teaching or suggestion to alter Shpak’s teaching that a transmission would occur on a channel sensed to be idle. *Id.*, §§IV.C, D.1. Lundby simply does not teach any method for preventing transmission—rather, its decision tree always assumes that transmission will take place. *Id.*; §IV.B.2. Indeed, if the “common frequency channel” was busy but another channel was idle, the combination of Shpak and Lundby suggests that the idle channel would be used. *Id.* Thus, in Shpak-Lundby, the “common frequency channel” is not a channel “whose idle state governs whether there can be a transmission.” *Id.*

Further, as discussed in §IV.D.2, Petitioner fails to allege any motivation to modify how the decision to transmit is made so as to prevent transmission on an idle channel, based on the state of another channel. For example, Shpak provides no teaching relevant to the decision to transmit in multichannel systems, nor does it address the possibility of leakage from one channel to another. Geier at ¶126; §IV.A. Lundby also does not address interference between distinct frequency channels. *Id.*; §IV.B.1, D.2. Instead, Lundby at most pertains to co-channel interference *in the same frequency channel*, and does not address *preventing* transmission but rather by relying on *orthogonal codes* that *permit transmission* even when this channel is not idle. *Id.*; §IV.B.1. None of Petitioner’s proposed alternative motivations fill this gap, as discussed in §IV.D.2.

**Second**, even if the Board wishes to maintain its preliminary construction that a “mandatory channel” is “one channel in a wireless multichannel communication system **over which transmission must occur before transmission over the other wireless channels**,” Shpak-Lundby still does not disclose the claimed “mandatory channel.” As discussed above, neither Shpak nor Lundby provide any suggestion or reason to change the way in which the decision to transmit is made in multichannel systems. Thus, if Shpak-Lundby’s “common frequency channel” was busy but another channel was idle, there is nothing to suggest that transmission would be prevented on the idle channel. Geier at ¶127.

Therefore, even under the Board’s preliminary construction, the “common frequency channel” in Shpak-Lundby would not be a channel “over which transmission must occur before transmission over the other wireless channels.” *Id.*

**Third**, because Shpak-Lundby does not prevent transmission on an idle channel, even if it is not the “common frequency channel,” this combination fails to teach “setting a mandatory channel **that is always used.**” Geier at ¶128.

(b) [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.

Even if Shpak-Lundby is considered to teach a “mandatory channel” and step 1[A], this combination still fails to teach the step of “transmitting...**only** when the mandatory channel is idle.” This is because neither Shpak nor Lundby, alone or in combination, provide any teachings to change the way in which the decision to transmit would be made in a multichannel system. More particularly, neither Shpak nor Lundby, alone or in combination, teach preventing transmission when a “primary channel” is busy but a “secondary channel” is idle.

As discussed above, Lundby does not address how the decision to transmit is made in a multichannel system—rather, Lundby assumes that a channel is available to be treated as a “primary channel.” Geier at ¶130, §IV.B.2. Indeed, Lundby does not address *any* scenario in which the “primary channel” is

unavailable but the “secondary channel” is available, much less that transmission should be prevented. *Id.* This is in stark contrast to the ’551 Patent, which explicitly teaches that transmission is prevented when the “mandatory channel” is busy, ***even if*** another channel was idle. *Id.*; ’551 Patent at 6:51-55. As discussed in §§II.A-B, limiting transmission ***in this scenario*** is precisely how the ’551 Patent addresses power leakage. Specifically, if the mandatory channel is idle, transmission may occur on (i) the mandatory channel by itself, or (ii) the mandatory channel together with other idle channels. Geier at ¶130; e.g. ’551 Patent, cl. 1, Fig. 1. ***But***, if the mandatory channel is busy, then (iii) ***no transmission*** occurs, ***even if*** other channels are idle. Geier at ¶130; e.g., §II.B. Lundby’s decision tree, on the other hand, does not include prevention of transmission at all. *See* §IV.B.2. Rather, Lundby’s decision tree only contemplates something akin to scenarios (i) and (ii), which assume the availability of a “primary channel.” Geier at ¶130, §IV.2. However, it is scenario (iii) of the ’551 Patent that gives meaning to the limitation “transmitting...***only*** when the mandatory channel is idle.” *Id.* This is entirely absent from Lundby. *Id.*

Shpak cannot fill these gaps, as Shpak only teaches that transmission occurs on a channel that is sensed to be idle. *Id.* at ¶131, §IV.A. Thus, the combination of Shpak-Lundby likewise does not limit transmission in the manner claimed. *Id.* §§IV.C, D.1.

Further, as discussed in §IV.D.2, neither Shpak nor Lundby provide any motivation to modify the decision to transmit so as to prevent transmission based on the state of one channel. For instance, neither Shpak nor Lundby address the problem of power leakage between channels having distinct center frequencies. Geier at ¶132. Petitioner’s additional alleged motivations to combine Shpak and Lundby fail to fill this gap, as none of these motivations provide a reason to *prevent* transmission altogether. *Id.*; §IV.D.2 *supra*.

#### **4. Claim 3**

Dependent claim 3 depends from claims 1 or 2. Thus, Shpak-Lundby does not disclose claim 3 for at least the reasons addressed with respect to claim 1. Further, Petitioner has made no attempt to argue that Shpak-Lundby discloses the elements of claim 2, and thus cannot meet its burden as to claim 3 to the extent it incorporates claim 2. Geier at ¶133.

Thus, Shpak-Lundby does not disclose a “wireless packet communication method according to claim 1 or 2, wherein the plurality of wireless packets transmitted simultaneously are set to have a same or equivalent packet time length that corresponds to a packet size or a transmission time.” Geier at ¶134.

#### **5. Claim 4**

Dependent claim 4 depends from claims 1 or 2. Shpak-Lundby does not disclose any of the methods of claims 1 or 2 for at least the reasons addressed

above in claim 3. Further, neither Shpak nor Lundby discloses the use of MIMO, or “multiple wireless channels” within the meaning of the ’551 Patent. Geier at ¶135. Thus, Shpak-Lundby does not disclose “simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO.”

**6. Claim 5**

Independent claim 5 is the apparatus analog of claim 1. As discussed with respect to claim 1, Shpak-Lundby fails to disclose the step of “setting a mandatory channel that is always used for transmission” or “transmitting...only when the mandatory channel is idle by using ...wireless channels that include...the mandatory channel.” Thus, for similar reasons, Shpak-Lundby fails to disclose a unit for performing these steps. Geier at ¶136.

**7. Claim 7**

Claim 7 depends from claims 5 or 6, and is the apparatus analog of claim 3. Thus, Shpak-Lundby fails to disclose claim 7 for reasons similar to those addressed for claims 5 and 3. Geier at ¶137. Petitioner has not attempted to show that Shpak-Lundby discloses claim 6.

**8. Claim 8**

Claim 8 depends from claims 5 or 6, and is the apparatus analog of claim 4. Thus, Shpak-Lundby fails to disclose claim 8 for reasons similar to those addressed



for claims 5 and 4. Geier at ¶138. Petitioner has not attempted to show that Shpak-Lundby discloses claim 6.

**V. PETITIONER FAILS TO DEMONSTRATE THAT ANY CHALLENGED CLAIM IS UNPATENTABLE UNDER GROUND 1 (SHPAK-HO): CLAIMS 1, 3, 5, 7**

Petitioner relies on Shpak as allegedly disclosing a “mandatory channel.”

This is incorrect. Shpak, as Petitioner admits, discloses only a *single channel* for wireless communication. Pet. at 24 (“POSAs would have understood Shpak to disclose a conventional SISO system in which an AP transmits packets to a station over a SISO “common frequency channel”). However, as explained in §III.A, the ’551 Patent teaches that the “mandatory channel” is necessarily one of several available channels between two stations (i.e., a “multichannel system”). Thus, as the Board correctly reasoned, “multiple transmission channels are required, which is not taught by Shpak.” DI at 35.

Further, because Petitioner relies on Ho only for the disclosure of MIMO applicable to a single-channel, the combination of Shpak and Ho (“Shpak-Ho”) also fails to disclose the claimed “mandatory channel.”

**1. Claim 1**

**(a) [1A] setting a mandatory channel that is always used for transmission;**

Shpak-Ho does not disclose “setting a mandatory channel,” because this step is directed to identifying *one of several* frequency channels provided for

transmission between two associated stations as a “mandatory channel,” not merely “arranging” to use the only channel available.

As explained in §III.A, “mandatory channel” is properly construed “one channel in a multichannel system.” Thus, the combination of Shpak-Ho fails to disclose a “mandatory channel” because Shpak-Ho’s “common frequency channel” is not “one channel in a multichannel system,” but rather the *only* channel available. Further, Shpak-Ho fails to disclose the step of “setting a mandatory channel” because the ’551 Patent teaches that identification of a “mandatory channel” does not render it the only channel available—rather, as some preferred embodiments indicate, stations with an associated “mandatory channel” have the ability to use this channel together with another channel that is idle. *E.g.*, ’551 Patent at 6:8-11 (“In this example, since the wireless channel #1 as the mandatory channel is idle, the wireless packets is simultaneously transmitted by using two wireless channels as the wireless channels #1 and #2.”). In other words, “setting a mandatory channel” does not change the fact that the “mandatory channel” is but one of multiple provided channels. Geier at ¶¶142-143.

Petitioner suggests that the phrase “that is always used for transmission” supports its reading of “mandatory channel.” *See* Pet. at 34. While it is true that the “mandatory channel” must always be used, Petitioner’s interpretation of this step—that “setting a mandatory channel” can result in a single-channel system—

would render it a nullity. Indeed, as discussed in §III.A, the claim language itself indicates the presence of other channels. For example, the very use of the qualifier “mandatory” indicates the existence of a non-mandatory state, which Petitioner’s interpretation fails to acknowledge. *See also* Geier at ¶144. Specifically, the ’551 Patent clearly teaches that a “mandatory channel” may be so termed because its idle state determines transmissions in a way that differs from that of other available channels. *Id.* However, if “setting a mandatory channel” means little more than assigning a single channel for use, this channel paradoxically stops being “mandatory”; once assigned, every legacy 802.11 channel, such as in Shpak, would be used in exactly the same way as any other assigned channel—a transmission would occur if the assigned channel is idle, regardless of the state of other channels. *Id.* Put another way, in a single-channel system, there are no other channels against which a purported “mandatory channel” may be distinguished as “mandatory.” *Id.*

The language requiring the “mandatory channel” to “always” be used likewise indicates a multichannel system. Common sense dictates that if no other channels *could* be used (such as in a single-channel system), there would be no need to specify that the “mandatory channel” must “always” be used. Petitioner’s interpretation of this language would render it trivial, as any wireless

communication must use some form of channel, regardless of whether it is “mandatory” or not. Geier at ¶145.

- (b) **[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.**

Shpak-Ho fails to disclose the step of “transmitting...by using a wireless channel/wireless channels that include/includes the mandatory channel,” because, *inter alia*, Shpak-Ho fails to disclose the claimed “mandatory channel,” as discussed above.

Further, similar to step [1A], the language of step [1B] indicates that multiple channels are provided for transmission, such as by sending wireless packets using “wireless channels that...**include** the mandatory channel.” *See also* Geier at ¶147. The language limiting transmission to times “**only** when the mandatory channel is idle” also relies on the availability of other channels—were it otherwise, this language, too, would be rendered a nullity because single-channel CSMA systems have always waited for the channel to be idle before transmitting. *Id.*; *also* ’551 Patent at 1:30-37. It is not trivial, however, to limit transmission to times when only one of multiple channels is idle, even if other idle channels are available. *Id.*; §II.B. This is precisely what the ’551 Patent teaches—“[w]hen the mandatory channel is busy, each STA does not perform transmission even if there

is another idle wireless channel.” *E.g.*, ’551 Patent at 3:56-57. The claim language limiting transmission to times “only when the mandatory channel is idle” is clearly directed to this type of scenario. Geier at ¶147.

## 2. Claim 3

Claim 3 depends from claim 1 or claim 2. Shpak-Ho fails to disclose the limitations of claim 3 for at least the following reasons: First, claim 3 depends from claim 1. Shpak-Ho fails to disclose this claim because it fails to disclose the elements of claim 1. Second, Petitioner has not attempted to argue that Shpak-Ho discloses claim 2, and thus cannot meet its burden to show that Shpak-Ho discloses claim 3 to the extent it depends from claim 2. Geier at ¶148.

## 3. Claim 5

- (a) **a unit setting a mandatory channel that is always used for transmission; and transmitting the wireless packets only when the mandatory channel is idle by using a wireless channel or wireless channels that includes/include the mandatory channel.**

Claim 5 is the apparatus-analog of claim 1. Thus, Shpak-Ho fails to disclose claim 5 because it fails to disclose a unit for performing the steps of claim 1. Geier at ¶149.

## 4. Claim 7

Dependent claim 7 depends from claims 5 or 6, and is the apparatus analog of claim 3. Because Shpak-Ho fails to disclose claim 5, it fails to disclose claim 7.

Petitioner has not attempted to show that Shpak-Ho can meet the requirements of claim 6. Geier at ¶150.

**VI. PETITIONER FAILS TO DEMONSTRATE REASONABLE LIKELIHOOD ANY CHALLENGED CLAIM IS UNPATENTABLE UNDER GROUND 3: CLAIMS 1-3, 5, 7**

Petitioner argues that Bugeja, in combination with Ho (“Bugeja-Ho”), discloses transmission using “a single wireless channel determined to be idle and MIMO” and therefore meets the claims’ requirement of transmitting on a “mandatory channel that is always used for transmission.” As with Ground 1, Ground 3 fails because Petitioner only relies on Bugeja’s teaching of a *single* channel assigned to a given client. Pet. at 59; DI at 38 (“Petitioner relies on Bugeja’s ‘primary channel’ as the ‘single wireless channel’”). This is not a “mandatory channel.” Geier at ¶151.

Moreover, Bugeja teaches against the idea of using a “mandatory channel,” because it teaches that all available channels should be used indiscriminately. Geier at ¶152. As the Board correctly reasoned, “Bugeja’s ‘primary channel’ is not the recited ‘mandatory channel’ because there is no showing that there is no transmission on the secondary channels when the primary channel is transmitting, *i.e.*, is not idle.” DI at 38.

**1. Claim 1**

**(a) [1A]**

Bugeja-Ho does not disclose the step of “setting a mandatory channel,” because these references, alone or in combination, fail to disclose a “mandatory channel.” Since Petitioner relies on Bugeja for the alleged disclosure of a “mandatory channel,” this discussion focuses on Bugeja.<sup>5</sup>

The Board correctly construed the claimed “mandatory channel” to be “one channel in a wireless multichannel communication system.” Thus, Bugeja’s assignment of a single channel--“the primary channel or any of the secondary channels” (*id.* at ¶32)—to a given client cannot satisfy the claimed “mandatory channel.” In other words, as with Ground 1, assignment of a single channel cannot meet the step of “setting a mandatory channel,” because to do so results in a single-channel system. Geier at ¶154.

Moreover, Bugeja *teaches against* setting a “mandatory channel.” As discussed in §III.B, the “mandatory channel” is mandatory because it is treated *differently* from other channels, in that transmission can occur “*only* when the mandatory channel is idle,” as opposed to when *any* channel is idle. Geier at ¶155, citing ’551 Patent at 3:56-57. Thus, NTT agrees with the Board that the

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<sup>5</sup> As in Ground 1, Ho is cited only for disclosing single-channel MIMO.

“mandatory channel” is used to “control system transmission.” DI at 39. Bugeja, however, teaches that transmission *does* take place on a secondary channel regardless of whether the primary channel is idle. *Id.* For example, if a secondary channel is assigned to a single-channel client, then transmission would occur whenever this channel is idle, without regard for the idle state of the primary channel assigned to a different client. *See* EX1007 at ¶32 (“A client 410 in the inner region 410 is assigned the primary channel **or any of the secondary channels...**”); Pet. at 63, Geier at ¶155. Bugeja treats all channels the same because transmission on any channel—whether primary or secondary—does not depend on the idle state of another. Geier at ¶155. This is the opposite of what the ’551 Patent teaches. As a consequence, Bugeja also fails to meet either the Board’s preliminary construction (DI at 38-39) or NTT’s modified construction, because both constructions require limiting transmissions based on the state of the “mandatory channel.” *Id.* at ¶155.

Petitioner admits that a single-channel client may be assigned to only a secondary channel for transmission, but contends that this channel is not a “mandatory channel.” Pet. at 59, 68. However, Petitioner’s arguments only reinforce the fact that Bugeja does **not** disclose a “mandatory channel.” Consider the logical implications of Petitioner’s proposal that a “mandatory channel” is only one that is always used for transmission “for a particular device” (*Id.* at 62). Under



this interpretation, a secondary channel assigned to a single-channel client in the inner region also becomes “mandatory” for that device. Geier at ¶116. In other words, under Petitioner’s understanding, there would be no distinction between Bugeja’s primary and secondary channels—they would be “mandatory” upon assignment to a single-channel client, which in effect means that *none* of them are “mandatory” because they are treated the same way for transmission purposes. *Id.*; *see also, Merck & Co. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) (“A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.”).

A similarly nonsensical result obtains for the Petitioner’s treatment of Bugeja’s multichannel clients. For example, Petitioner argues that Bugeja’s secondary channels are not mandatory because a multichannel client in the inner region may transmit on *either* of the secondary channels, such that neither one is necessarily used. Pet. at 68, 70. This argument is self-defeating and contradicted by Bugeja’s explicit teachings. *See* Geier at ¶157. First, Petitioner argues that the primary channel cannot be assigned to a client in the inner region (Pet. at 70), but this is not correct. To the contrary, Bugeja teaches that “[a] client 410 in the inner region 410 is assigned **the primary channel or any of the secondary channels**,” (EX1007 at ¶32), that “[a] client 410 located within the inner region 406 can communicate **on all three channels**” (*id.* at ¶33), and that for a multichannel client

800 “**the three channels can be used simultaneously** to upload or download when the client is located in the inner region 614 of the cell” (*id.* at ¶46). And, since the Petitioner admits that a multichannel client in the inner region need not use all channels provided to it at any given time (Pet. at 70), it follows that this multichannel client could transmit on a secondary channel and not the primary channel. Geier at ¶157. Again, the logical extension of Petitioner’s arguments shows that none of Bugeja’s channels are “mandatory.”

Bugeja also fails to teach any channel that is “always used for transmission.” Geier at ¶158. Specifically, since Bugeja explicitly teaches that a client in the inner region may be assigned to *one* of the secondary channels, this means that the primary channel **will not be used** if there is no client in the outer region, or if at a given moment the AP is only transmitting to the inner region client. *See* EX1007 at ¶35. Petitioner admits as much by urging that the only scenario where Bugeja’s primary channel is “always used” is if *all* clients are in the outer region. *See* Pet. at 63.

(b) [1B]

Bugeja-Ho fails to disclose the step of “transmitting wireless packets...only when the mandatory channel is idle.” As discussed with respect to [1A], Bugeja-Ho does not disclose the claimed “mandatory channel.” Thus, it follows that Bugeja-Ho also fails to disclose transmission on a mandatory channel.

Further, Bugeja teaches against transmitting “only when the mandatory channel is idle.” For example, as discussed above with respect to [1A], Bugeja teaches that transmission on *any* channel—whether secondary or primary—will take place regardless of the state of any other channel. Thus, Bugeja does not teach transmitting *only* when the “mandatory channel” is idle. Geier at ¶160.

Indeed, Bugeja teaches against tying transmission to the idle state of a “mandatory channel,” even when multiple channels are available. *Id.* at ¶160. Specifically, only one embodiment in Bugeja relates to a multichannel system—the multi-channel client in Bugeja’s inner region may use up to three channels to transmit and receive packets simultaneously. EX1007 at ¶46, Geier at ¶¶50, 121. Significantly, Bugeja indicates that this multi-channel client uses any one of, or all three channels, indiscriminately. *See* Bugeja at ¶46; Geier at ¶161. The only discernable criteria for channel use in Bugeja is a channel’s own idle state, not the idle state of the primary channel. *Id.*

## **2. Claim 2**

### **(a) [2A]**

Bugeja-Ho does not disclose the step of “distinguishing an STA A from an STA B, the STA for which a mandatory channel is set, the STA B for which no mandatory channel is set, the mandatory channel being always used for transmission.”

First, as discussed for claim 1, Bugeja-Ho does not disclose a “mandatory channel” because, in general, only a *single channel* is assigned to a given client, and because Bugeja does not teach any distinction between its primary and secondary channels based on a channel’s idle state. Geier at ¶163.

Second, since Bugeja teaches that channel(s) assigned to a client are used indiscriminately, there is no way to distinguish between an STA with an alleged “mandatory channel” from one without. Geier at ¶164. For example, as with claim 1, Petitioner incorrectly interprets “mandatory channel” as merely a channel that is always used for a particular device, even if it is the only channel available. However, *even if* this interpretation is adopted, there is no way to distinguish between clients assigned the primary channel from those assigned a secondary channel on the basis of whether they have a “mandatory channel”—rather, under Petitioner’s interpretation, clients assigned a secondary channel also have a “mandatory channel” because they have one channel that is “always used” for transmission. *Id.* The same result obtains for multichannel clients, because Bugeja teaches that multichannel clients can access all three of the primary and secondary channels, but need not transmit on any particular one. *See supra* at §VI.1.a. Thus, multichannel clients cannot be distinguished on the basis of whether they have a “mandatory channel.” Geier at ¶164.

Petitioner argues that because Bugeja can distinguish between clients “based on their distance from the AP,” this satisfies claim element [2A]. Pet. at 68. This argument is beside the point—claim 2 requires distinguishing a client based on **whether it has a “mandatory channel,”** not whether it is close to an AP or not. As discussed above, Petitioner’s interpretation would mean that a secondary channel assigned to a single-channel client in the inner region also has a “mandatory channel.” Geier at ¶165.

**(b) [2B]**

Bugeja-Ho does not transmit to an STA A using a mandatory channel, for at least the reasons addressed above for claim element [1B]. Geier at ¶166.

**(c) [2C]**

Bugeja-Ho does disclose transmission using idle wireless channels without use of a “mandatory channel,” as to a multichannel client in Bugeja’s inner region. However, as with claim elements [1A] and [2A], this is the *only* form of transmission that Bugeja-Ho discloses. Indeed, the only criterion for transmission on a given channel in Bugeja is its own idle state. Geier at ¶167; *see also* Pet. at 70. Thus, by Petitioner’s own reasoning, a multichannel client in Bugeja’s inner region may transmit over any one, two, or all three available channels, including transmitting over a secondary channel without concurrent use of a primary channel. *See supra* at §VI.1.a, Pet. at 70.

**3. Claim 3**

Claim 3 depends from claim 1 or claim 2. Bugeja-Ho fails to disclose the limitations of claim 3 because it fails to disclose either the elements of claim 1 or 2. Geier at ¶168.

**4. Claim 5**

Claim 5 is the apparatus-analog of claim 1. Thus, Bugeja-Ho fails to disclose claim 5 because it fails to disclose a unit for performing the steps of claim 1. Geier at ¶169.

**5. Claim 6**

Claim 6 is the apparatus-analog of claim 2. Thus, Bugeja-Ho fails to disclose claim 2 because it fails to disclose a unit for performing the steps of claim 2. Geier at ¶170.

**6. Claim 7**

Claim 7 depends from claims 5 or 6, and is the apparatus-analog of claim 3. Thus, Bugeja-Ho fails to disclose claim 7 for reasons similar to those addressed for claims 3, 5, and 6. Geier at ¶171.

**VII. THERE IS NO REASONABLE LIKELIHOOD ANY CHALLENGED CLAIM IS UNPATENTABLE UNDER GROUND 4: CLAIMS 4 AND 8**

Claims 4 and 8 are dependent claims. Claim 4 depends from claims 1 or 2, and claim 8 depends from claims 5 or 6. Neither Shpak-Ho-Thielecke nor Bugeja-Ho-Thielecke disclose claims 4 or 8.

**1. Shpak-Ho-Thielecke fails to disclose claims 4 or 8**

As with Ground 1, Shpak-Ho fails to disclose the elements of claim 1 because, *inter alia*, it fails to disclose the claimed “mandatory channel.” Thielecke also only pertains to the use of a single frequency channel on which MIMO transmissions may take place. Geier at ¶173, *also e.g.*, EX1035 (“Thielecke”) at ¶9, 32. Thus, Shpak-Ho-Thielecke fails to disclose claim 4 for at least the same reasons as discussed for claim 1. Petitioner does not argue that Shpak-Ho meets the requirements of claim 2. Geier at ¶173.

Claim 8 depends from claims 5 or 6. Thus, Shpak-Ho-Thielecke does not disclose claim 8 for at least the same reasons as addressed for claim 5. Petitioner has not attempted to argue that Shpak-Ho meets the requirements of claim 6. Geier at ¶174.

Further, Shpak-Ho-Thielecke fails to disclose claims 4 or 8 because merely reducing the number of MIMO streams cannot satisfy “selectively using the **multiple wireless channels or the MIMO.**” Geier at ¶175. Petitioner admits that Shpak-Ho only discloses a single channel that is MIMO, but argues that selecting between “multiple wireless channels or the MIMO” can consist simply of adjusting the number of MIMO data streams. Pet. at 73. This is not what the claim language requires—the choice presented in claims 4 and 8 is between “multiple wireless channels” and “MIMO,” **not** between “single channel without MIMO” and “single

channel with MIMO.” As the ’551 Patent teaches, MIMO technology permits multiple data streams in a *single channel*, and thus reducing or increasing the number of MIMO paths (“layers” or “strata” in Thielecke) does not affect the number of channels. *See e.g.*, ’551 Patent at 1:61-63 (“In MIMO, different wireless packets are transmitted from a plurality of antennas at the same time on **the same wireless channel.**”); Geier at ¶175. Indeed, Petitioner admits that Thielecke describes the ability to reduce the number of MIMO “subchannels,” not changing the number of channels provided in Shpak-Ho. *See* Pet. at 73.

## **2. Bugeja-Ho-Thielecke fails to disclose claims 4 or 8**

As discussed above with respect to Ground 3, Bugeja-Ho fails to disclose the claims 1, 2, 5, or 6, because Bugeja-Ho fails to disclose a “mandatory channel,” and because Bugeja-Ho fails to disclose distinguishing between stations based on whether they have a “mandatory channel.” Thielecke fails to remedy these defects. Thus, Bugeja-Ho-Thielecke fails to disclose claims 4 and 8 for at least the same reasons as those addressed with respect to claims 1, 2, 5 and 6. Geier at ¶176.

Further, like Shpak-Ho-Thielecke, Bugeja-Ho-Thielecke also discloses no more than adjusting the number of MIMO data streams *within a single channel*. There is no selection between “multiple wireless channels” and MIMO, as claims 4 and 8 require. Geier at ¶177.



### **VIII. CONCLUSION**

For at least the foregoing reasons, the Board should deny institution of the Petition in its entirety.

Dated: May 19, 2021

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**CERTIFICATE OF SERVICE**

Pursuant to 37 C.F.R. §§ 42.8 and 42.6(e), the undersigned hereby certifies that the foregoing **Patent Owner's Response to Petition for *Inter Partes* Review Under 37 C.F.R. § 42.120** was served electronically via e-mail to:

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**CERTIFICATION UNDER 37 C.F.R. § 42.24**

Under the provisions of 37 C.F.R. § 42.24, the undersigned hereby certifies that the word count for the foregoing Patent Owner Preliminary Response totals 13,956 words, which is less than the 14,000 allowed under 37 C.F.R. § 42.24(a)(1)(i), (b)(1).

Dated: May 19, 2021

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