

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORPORATION,
Petitioner,

v.

UNILOC 2017 LLC,
Patent Owner.

IPR2020-00102
Patent 6,498,541 B2

Before GRACE KARAFFA OBERMANN, JON B. TORNQUIST, and
JOHN D. HAMANN, *Administrative Patent Judges*.

HAMANN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, Microsoft Corporation (“Petitioner”) challenges the patentability of claim 1 (“the challenged claim”) of U.S. Patent No. 6,498,541 B2 (Ex. 1001, “the ’541 patent”), owned by Uniloc 2017 LLC (“Patent Owner”). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

For the reasons discussed herein, we determine that Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable.

II. BACKGROUND

A. Procedural History

Petitioner filed its Petition requesting *inter partes* review of claim 1 of the ’541 patent. Paper 2 (“Pet.”). The Petition is supported by the Declaration of Henry Houh (Ex. 1003). Patent Owner filed a Preliminary Response. Paper 7.

We instituted *inter partes* review of the challenged claim of the ’541 patent on all of the grounds raised in the Petition. Paper 8 (“Dec. on Inst.”), 7, 32. Patent Owner filed a Response to the Petition. Paper 10 (“PO Resp.”). Petitioner filed a Reply to Patent Owner’s Response. Paper 11 (“Pet. Reply”). The Reply is supported by the Reply Declaration of Henry Houh (Ex. 1018). Patent Owner filed a Sur-Reply to Petitioners’ Reply. Paper 18 (“PO Sur-Reply”).

An oral hearing was held on February 10, 2021. A transcript of the oral hearing is included in the record. Paper 25 (“Tr.”). Based on arguments presented at the oral hearing, we authorized the parties to file additional briefing (opening briefs and responsive briefs) directed to the meaning of a

limitation and the effect of the meaning on the unpatentability issues before us. Paper 24 (“Order Add. Br.”). In accordance with our authorization, Petitioner filed its Opening Post-Hearing Brief (Paper 26, “Pet. Open. Br.”) and Patent Owner filed its opening Additional Briefing (Paper 27, “PO Open. Br.”). In response to the opening briefs, Petitioner filed its Responsive Post-Hearing Brief (Paper 28, “Pet. Resp. Br.”) and Patent Owner filed its Response to Petitioner’s Post-Hearing Brief (Paper 29, “PO Resp. Br.”).

B. Related Matters

The parties identify the following as related matters that involve the ’541 patent: (1) *Uniloc 2017 LLC v. Microsoft Corp.*, 8-19-cv-00955 (C.D. Cal.), filed May 20, 2019; and (2) *Microsoft Corp. v. Uniloc 2017 LLC*, IPR2020-00103 (PTAB), which is directed to different claims of the ’541 patent, and was filed concurrently with this Petition. Pet. vii; Paper 5, 2. We denied review in IPR2020-00103.

C. The Challenged Patent (Ex. 1001)

The ’541 patent generally relates to “a communication bus system in which a plurality of stations [are] connected by signal transmission lines to enable communication between the stations.” Ex. 1001, 1:7–9. More specifically, the ’541 patent relates to “reduc[ing] the time that the bus needs to reserve to detect connection and/or disconnection” of stations to the bus system. *Id.* at 1:63–65. To that end, the ’541 patent teaches that instead of reserving a time slot for detection during which no transmission is possible, using “wave reflection . . . to detect the presence or absence of stations coupled to the bus system.” *Id.* at 1:52–55, 1:67–2:2.

Figure 1, shown below, “shows a topology of a bus communication system,” in accordance with the ’541 patent. *Id.* at 2:45.

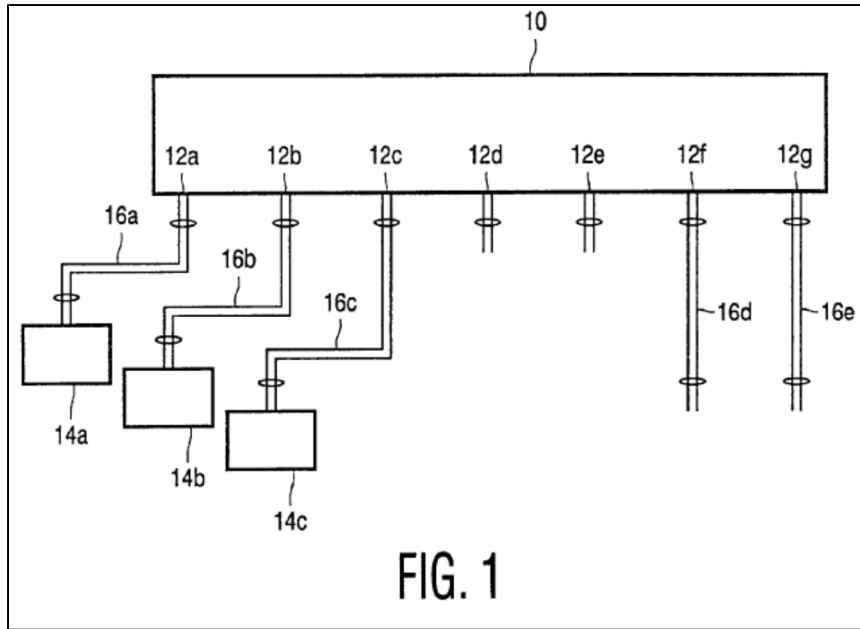


Figure 1, above, “shows a ‘flat’ topology, with only one master station 10 and a number of slave stations 14a–c.” *Id.* at 3:9–10. As shown, master station 10 has connectors 12a–g. *Id.* at 2:52–53. Slave stations 14a–c are shown as connected to master station 10’s connectors 12a–c, respectively, via respective cables 16a–c. *Id.* at 2:54–55. Nothing is shown connected to connectors 12d,e, and “connectors 12f,g are connected to cables 16d,e, which, however, are not connected to any [slave] stations.” *Id.* at 2:55–58.

Figure 2, shown below, “shows a station . . . for use as [a] master station in a bus system,” in accordance with the ’541 patent. *Id.* at 3:15–16.

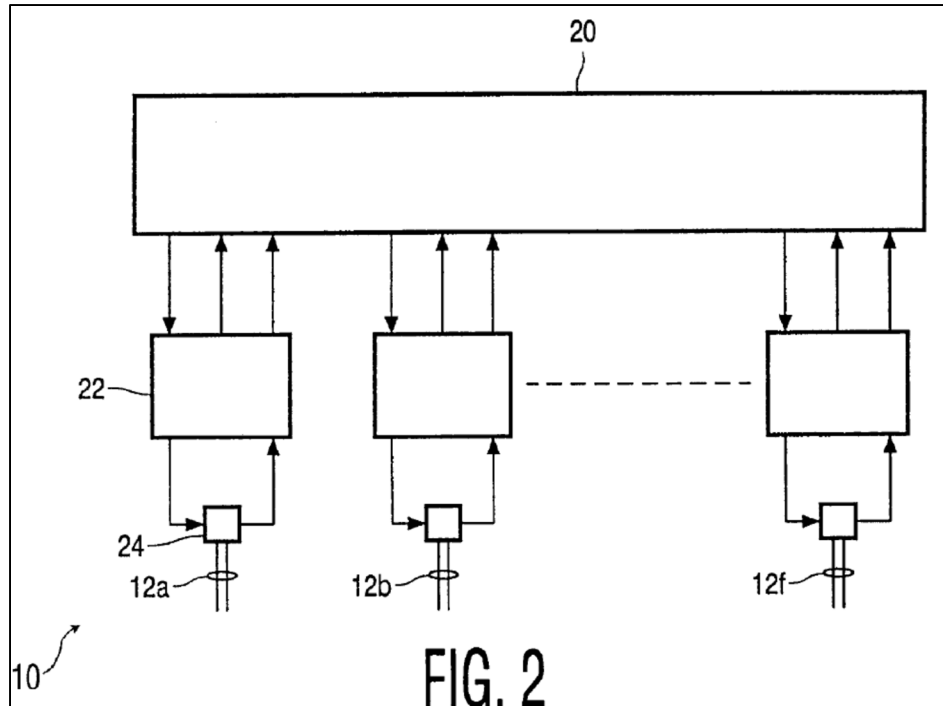


Figure 2 shows station 10 for use as a master station in a bus system, such as shown in Figure 1, in accordance with the '541 patent. *Id.* at 3:15–16, Fig. 1 (showing like reference numeral 10). Master station 10 contains processor 20, and as shown for connector 12a, connector control circuit 22 and wave splitter 24. *Id.* at 3:16–18. As shown, “processor [2]0 is coupled to . . . connector control circuit 22 with an interface for sending information, for receiving information[,] and for receiving a detection of connection or disconnection of a slave station to . . . connector 12a.” *Id.* at 3:18–22, Fig. 2. In turn, “connector control circuit 22 has an output coupled to an input of wave splitter 24 and an input connected to an output of wave splitter 24.” *Id.* at 3:22–24. As shown, “[w]ave splitter 24 [also] has a transmission line output coupled to . . . connector 12a.” *Id.* at 3:24–25.

The '541 patent teaches that, in operation, “connector control circuit 22 transmits signals to . . . connector 12a via wave splitter 24.” *Id.* at 4:1–2. “Wave splitter 24 sends data and/or commands [(i.e., the transmit signals)]

to . . . slave station 14a,” (i.e., an outgoing wave vector). *Id.* at 4:19–21, 4:42–44, code (57). The ’541 patent teaches that wave splitter 24 also may receive, via connector 12a, an incoming wave vector that “is a result of reflection by whatever is present at . . . connector 12a or the end of . . . cable 16a connected to . . . connector 12a, be it . . . slave station 14a or an open end.” *Id.* at 4:44–48, code (57). In accordance with the ’541 patent, wave splitter 24 splits off this reflected wave vector, “and it applies this wave vector to connector control circuit 22.” *Id.* at 4:51–53. The ’541 patent teaches that “[c]onnector control circuit 22 uses this reflected wave vector to decide whether . . . slave station 14a is connected to . . . connector 12a via . . . cable 16a.” *Id.* at 4:53–56.

For example, “connector control circuit 22 decides that . . . slave station 14a is present if the ratio between amplitudes of the wave vectors . . . of the reflected wave and the transmitted wave is equal to or below a threshold value.” *Id.* at 4:63–67. Otherwise, “[c]onnector control circuit 22 decides that no slave station 14a is present if the ratio is above the threshold” value. *Id.* at 4:67–5:2. The ’541 patent teaches that, alternatively, “when the wave splitter applies an outgoing wave with a fixed average amplitude to . . . cable 16a, it is not necessary to determine the ratio between the wave vectors explicitly and the amplitude of the reflected wave may be compared with a threshold value.” *Id.* at 5:8–13.

Notably, the ’541 patent teaches having slave station 14a’s characteristic impedance be substantially the same as cable 16a’s characteristic impedance so as to minimize any reflected wave vector. *Id.* at 2:6–15, 4:57–59; *see also id.* at 4:15–33 (teaching that reflection coefficient equals 0 for matching impedances). In contrast, the ’541 patent teaches that when slave station 14a is not present, cable 16a is terminated with infinite

impedance (i.e., open ended), which maximizes the reflected wave vector. *Id.* at 4:30–31, 4:15–33 (teaching that reflection coefficient equals 1, when “the cable is open ended at the point of termination”).

D. The Challenged Claim

Petitioner challenges independent claim 1 of the ’541 patent. Claim 1 is reproduced below:

1. A method of controlling a bus communication system, wherein the connection of a station to the bus system via a connector is detected by transmitting a transmitted wave signal via the connector and splitting of a return wave received at the connector, the bus system being operated in accordance with presence or absence of the further station dependent on non-detection and detection of a reflection of the transmitted wave signal respectively.

Ex. 1001, 5:59–6:5.

E. Instituted Grounds of Unpatentability

We instituted trial based on the following grounds of unpatentability, which are all the grounds of unpatentability raised in the Petition:

Claim Challenged	35 U.S.C. § ¹	References/Basis
1	103(a)	Lee, ² 802.3u ³

¹ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the ’541 patent issued from an application filed before March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability.

² U.S. Patent No. 5,737,316 (issued Apr. 7, 1998) (Ex. 1004).

³ Institute of Electrical and Electronics Engineers (“IEEE”) Standards for Local and Metropolitan Area Networks: Supplement to Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications (June 1995) (hereinafter “802.3u”) (Ex. 1005).

Claim Challenged	35 U.S.C. § ¹	References/Basis
1	103(a)	USB 1.1, ⁴ Morris ⁵

Pet. 15–48; Dec. on Inst. 7, 32.

III. LEVEL OF ORDINARY SKILL IN THE ART

To determine whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quoting *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). “[O]ne or more factors may predominate.” *Id.*

In our Decision on Institution, we adopted Petitioner’s proposed definition for one having ordinary skill in the art at the time of the invention of the ’541 patent as one who “would have had a Bachelor’s Degree in Electrical Engineering or a related subject, and at least one year experience designing electronics devices for use in communications systems, including both hardware and software components.” Dec. on Inst. 9 (quoting Pet. 13–14 (citing Ex. 1003 ¶ 50)). We also adopted Petitioner’s additions that “[l]ess work experience may be compensated by a higher level of education, such as a Master’s Degree, and vice versa,” and that one of ordinary skill in

⁴ Universal Serial Bus (“USB”) Specification Rev. 1.1, (Sept. 1998) (hereinafter “USB 1.1”) (Ex. 1006).

⁵ U.S. Patent No. 6,631,159 B1 (issued Oct. 7, 2003) (Ex. 1007).

the art “would have had working familiarity with known communications bus technologies and related standards, including those specified by 802.3u . . . and USB 1.1.” *Id.* (quoting Pet. 14 (citing Ex. 1003 ¶ 50)).

Patent Owner does not dispute our adoption of Petitioner’s definition, and does not provide its own definition for the level of ordinary skill at the time of the invention of the ’541 patent. *See* PO Resp. 6.

Because Petitioner’s unopposed definition of the level of skill in the art is consistent with the disclosures of the ’541 patent and the asserted prior art references, we adopt Petitioner’s definition for purposes of this Final Written Decision. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). We apply Petitioner’s definition in our analysis below.

IV. CLAIM CONSTRUCTION

Because the Petition was filed after November 13, 2018, we construe the challenged claims by applying “the standard used in federal courts, in other words, the claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b), which is articulated in *Phillips* [*v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc)].”⁶ Under *Phillips*, the words of a claim are generally given their “ordinary and customary meaning,” which is the meaning they would have to a person of ordinary skill in the art at the time of the invention, in light of the specification and prosecution history. *See Phillips*, 415 F.3d at 1312–13.

⁶ Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,343–44 (Oct. 11, 2018) (codified at 37 C.F.R. pt. 42).

Petitioner argues in its Petition that all claim terms should have their plain and ordinary meaning, and “that no claim terms require specific construction to resolve the unpatentability issues presented” in the Petition. Pet. 14 (citation omitted). Similarly, Patent Owner in its Response argues for each claim term “that the Board [should] adopt the ordinary and customary meaning of the claim term as understood by one of ordinary skill in the art.” PO Resp. 7.

During the hearing, however, the parties acknowledged that a claim construction dispute may exist, which relates to claim 1’s limitation of “the bus system being operated in accordance with presence or absence of the further station dependent on non-detection and detection of a reflection of the transmitted wave signal respectively.” See Tr. 67:9–68:8, 68:20–69:12. Accordingly, we authorized the parties to file post-hearing briefing to address the construction of this limitation. Order Add. Br. 2–3.

From this additional briefing, we identify the following construction disputes: (i) the meaning of “presence” and “absence,” (ii) the meaning of “being operated in accordance with,” and (iii) whether “or” in the limitation is disjunctive and requires having only one of either “presence” or “absence.”

A. Presence and Absence

Petitioner argues that “[p]resence’ of a further station means that a reflected wave signal either cannot be detected or falls below a specific threshold,” and that “[a]bsence’ means the opposite: that a reflection of the transmitted wave signal can be detected or exceeds a specific threshold.” Pet. Open. Br. 5. Petitioner argues that “[t]he claim itself recites that presence ‘depend[s]’ on ‘non-detection . . . of a reflection of the transmitted

wave signal,” and that the “‘respectively’ language at the end of the claim itself makes clear that ‘non-detection’ corresponds to ‘presence’ and ‘detection’ corresponds to ‘absence.’” *Id.* Petitioner quotes the following portion of the Specification in support of the meanings of these terms:

[C]onnector control circuit 22 decides that a slave station 14a *is present* if the ratio between amplitudes of the wave vectors A1, A2 of the reflected wave and the transmitted wave is equal to or below a threshold value between 1 and 0. Connector control circuit 22 decides that *no slave station 14a is present* if the ratio is above the threshold.

Id. at 5–6 (quoting Ex. 1001, 4:63–5:2); *see also id.* at 5 (quoting Ex. 1001, 4:57–60) (“The slave station 14a, *if present*, applies substantially the characteristic impedance R of the cable 16a to the end of the cable 16a, so that the *reflection coefficient G substantially equals zero* if the slave station is connected to the cable 16a.”).

In addition, Petitioner argues that “[w]hile the ’541 patent often describes connected devices as present, the two terms are not synonymous as a ‘connected’ device can be present *or* absent.” *Id.* at 6 (citing Ex. 1001, 2:66–3:8). In particular, Petitioner argues that the ’541 patent teaches “how connected stations may have ‘dynamical impedances’ that create either a matched impedance or an open circuit.” *Id.* (citing Ex. 1001, 2:66–3:8). Petitioner argues that “[b]ecause impedance matching (and an absence of wave reflection) is not necessarily created by ‘physical connection,’ a device’s ‘presence’ / ‘absence’ is different from physical connection / disconnection.” Pet. Resp. Br. 3. Thus, “[d]evice presence on a particular connection (*i.e.*, link) is best understood in terms of whether a reflected wave signal is not detected on that connection,” according to Petitioner. *Id.* (citing Pet. Open. Br. 5–7).

Patent Owner argues that claim 1’s “connection of a station to the bus system” informs the meaning of “presence or absence of the further station,” and both “relate specifically to connecting and disconnecting stations at will, meaning connection and disconnection of the station using the connector at the user level.” PO Open. Br. 1 (citing PO Resp. 19 (quoting Ex. 1001, 1:12–14 (“A USB system has connectors, which the user may use to connect and disconnect stations at will, even when the system is running.”))). Put differently, Patent Owner argues that “presence or absence in the claim corresponds with connected or disconnected, which means physically connected or disconnected at the connector (as in by a user).” PO Open. Br. 3–4; *see also* PO Resp. 19 (citing Ex. 1001, 2:16–36 (arguing “presence or absence of the further station . . . refers to a complete connection or disconnection rather than a ‘failure’ of a link”))).

In addition, Patent Owner argues that the portion of the Specification (Ex. 1001, 2:66–3:8) that Petitioner cites to argue that a “connected” device can be present or absent “does not refute a general correspondence between being connected and present.” PO Resp. Br. 5. Rather, “[w]hat is described is an exception whereby a slave station that is not powered up or not prepared to operate as a slave station in the bus system can be deemed disconnected and not present based on a supplied impedance,” according to Patent Owner. *Id.*

Having reviewed the parties’ arguments, we disagree with Patent Owner that this limitation is limited to connecting and disconnecting stations at will or physically. Rather, we agree with Petitioner that presence or absence for a particular connection is best understood in terms of whether a reflected wave signal is detected for that connection. This conclusion best comports with the plain claim language, which recites that a connection is

detected by transmitting a transmitted wave signal, splitting a return wave, and being operated dependent on whether there is a reflection of the transmitted wave signal. Ex. 1001, 5:59–6:5.

And this conclusion best comports with the Specification’s teachings. We agree that the system of the ’541 patent can detect when a station is physically connected to the bus system using reflected wave signals. *E.g.*, Ex. 1001, 1:34–42. The Specification also teaches, however, that a station can be physically connected yet appear as present or absent depending on whether the station chooses to operate as a station in the bus system. *Id.* at 2:66–3:8. Specifically, the Specification teaches the following:

Preferably, in case of slave stations 14a–c that need their own power supply independent of their connection to the bus system, or slave stations that are able to choose whether or not to operate as a slave station in the bus system, *the termination impedances are dynamical impedances*, which take their operational value only when power is supplied to the slave station 14a–c, *another impedance (like an open circuit) being applied to the cable 16a–c when the slave station 14a–c is not powered up or not prepared to operate as a slave station in the bus system.*

Id. (emphases added). In other words, even when a station is physically connected to the bus system, the Specification teaches that the station can appear as an open circuit (i.e., absent), using dynamical impedances, when the station “is not powered up or not prepared to operate as a slave station in the bus system.” *Id.* We are not persuaded by Patent Owner’s characterization of this teaching from the Specification as being an “exception” to the “general correspondence between being connected and present.” PO Resp. Br. 5. Patent Owner does not cite any evidence in making this “exception” argument to support excluding this teaching from the scope of claim 1.

Rather, we find that this portion of the Specification teaches embodiments (i.e., where stations need their own power supply or can choose whether to operate as a station in the bus system) that would be excluded from the scope of the claim if we require a physical connection or disconnection for presence or absence, as proposed by Patent Owner, which we find would be improper here. *See* Ex. 1001, 2:66–3:8; *SynQor, Inc. v. Artesyn Techs., Inc.*, 709 F.3d 1365, 1378–79 (Fed. Cir. 2013) (“A claim construction that ‘excludes the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support.’”).

Our discussion above sufficiently addresses the dispute between the parties as to the meaning of “presence” and “absence” for us to address the parties’ arguments concerning unpatentability. Accordingly, we do not further address this portion of the limitation. *See, e.g., Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’”).

B. Being Operated

Petitioner argues that “[t]he plain meaning of ‘being operated’ is broad, non-limiting, and does not require a specific type of operation,” but rather, “only recites a general operation of the bus consistent with either non-detection or detection of a reflected wave.” Pet. Open. Br. 3. To that end, Petitioner argues that the ’541 patent’s Specification “provide[s] non-limiting examples of how a system might be operated.” *Id.* at 4. First, Petitioner argues that the Specification “explains how prior art systems detected stations and ‘operate[d] accordingly: no messages commands etc.

are transmitted via connectors to which no downstream station is connected.” *Id.* (quoting Ex. 1001, 1:39–42). Second, Petitioner argues that the Specification also teaches generally “*operat[ing] in different control modes*, according to the presence or absence” of a further station. *Id.* (quoting Ex. 1001, code (57)); Pet. Resp. Br. 4 (same). Third, Petitioner argues that the Specification describes another example of being operated by teaching “an ‘upstream station . . . remov[ing] the downstream station logically from the system’ when a reflected wave is detected.” Pet. Open. Br. 4 (quoting Ex. 1001, 2:28–30; citing Ex. 1001, 2:35–36 (“describing logical incorporation”)). According to Petitioner, “being operated” is met by operating consistently with the non-detection or detection of a reflected transmitted signal. *Id.*

Patent Owner argues that the ’541 patent’s Specification “provides a definition with the use of a colon” for “being operated *in accordance with* presence or absence.” PO Resp. Br. 4. Specifically, Patent Owner argues that the Specification provides the following sentence: “The system detects whether or not a downstream station is connected to or disconnected from the connector and *operates accordingly*: no messages commands etc. are transmitted via connectors to which no downstream station is connected.” *Id.* (quoting Ex. 1001, 1:38–42); PO Open. Br. 1 (same). Patent Owner also argues that the Specification “explains elsewhere in the background the importance of logically incorporating and disincorporating the station to accomplish this operation.” PO Open. Br. 2; PO Resp. Br. 4 (same). Namely, Patent Owner quotes the following from the Specification:

The system detects whether a station has been connected to a connector and, if so, it logically incorporates the connected station into the system, so that communication with the station becomes possible. The system also detects when a station has

been disconnected and; if so, logically disincorporates the station from the system, so that no more communication with the station is performed or expected. This automatic incorporation and disincorporation is an important feature to make the system easy to use for non-specialist consumers.

PO Open. Br. 2 (quoting Ex. 1001, 1:14–23); PO Resp. Br. 4–5 (same); *see also* PO Open. Br. 2 (quoting Ex. 1001, 1:67–2:2, 2:16–18, 2:25–34) (providing, without further argument, quotes from the Specification). Patent Owner argues that merely “[c]hanging some behavior of the system based on particular relationships of multiple reflected waves fails to show operating in accordance with the presence or absence dependent on the non-detection or detection of the transmitted wave signal recited in the claim.” PO Resp. Br. 5.

Having reviewed the parties’ arguments, we agree with Petitioner that the plain and ordinary meaning of “being operated in accordance with presence or absence” in the context of the limitation broadly covers operating consistently with the non-detection (presence) or detection (absence) of a reflection of a transmitted signal. The claim language does not limit the scope of the claim to require a particular operation, other than that it is in accordance with the further station’s presence or absence.

Ex. 1001, 5:59–6:5. Moreover, we agree with Petitioner that the Specification provides examples of operations that each are in accordance with presence or absence, but does not limit the operations to any specific one. *Id.* at code (57) (“operate in different control modes”), 1:39–42 (“no messages commands etc. are transmitted”), 2:28–30 (“the upstream station takes the appropriate actions to remove the downstream station logically from the system”), 2:35–36 (“the upstream station takes the appropriate actions to incorporate the downstream station into the system”).

We disagree with Patent Owner (PO Resp. Br. 4.) that the Specification defines “being operated *in accordance with* presence or absence.” Rather, we determine that the sentence Patent Owner relies on as a definition instead provides an example of a claimed operation. *See* Ex. 1001, 1:38–42 (“The system detects whether or not a downstream station is connected to or disconnected from the connector and operates accordingly: no messages commands etc. are transmitted via connectors to which no downstream station is connected.”). First, the sentence’s operation (no messages commands etc. are transmitted) pertains only to when a station is absent, and thus, would be an incomplete definition that does not account for when a station is present. *Id.* Second, we are not persuaded that the use of a colon in the sentence would have signified to an ordinarily skilled artisan that what follows is a definition. Patent Owner does not point to any evidence to support this argument, and thus, we afford it little weight. *See In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (explaining that attorney arguments and conclusory statements that are unsupported by factual evidence are entitled to little probative value). Third, an inventor must define specific terms with “reasonable clarity, deliberateness, and precision” in order to be his own lexicographer. *See Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998) (“The patentee’s lexicography must, of course, appear ‘with reasonable clarity, deliberateness, and precision’ before it can affect the claim.”) (quoting *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994)). We find that this sentence lacks the necessary clarity, deliberateness, and precision to redefine the broad recital of “being operated in accordance with” so as to limit the term to a specific operation. Accordingly, we find that the cited sentence

provides an example of “being operated in accordance with presence or absence,” rather than a definition. *See* Ex. 1001, 1:38–42.

In addition, we disagree with Patent Owner that logically incorporating and disincorporating a further station is a necessary part of “being operated in accordance with presence or absence.” As we discuss above, although logical incorporation or disincorporation is an example operation that falls within the scope of claim 1, there is no basis in the claim language or Specification (which provides multiple example operations) to require any particular operation, such as logically incorporating and disincorporating a station. *See supra*; Ex. 1001, 1:39–42, 2:28–30, 2:35–36, 5:59–6:5. Nor are we persuaded that the Specification, by describing that “automatic incorporation and disincorporation is an important feature to make the system easy to use for non-specialist consumers,” acts to limit the claim language. Ex. 1001, 1:14–23. First, this passage relates to the background description of USB systems, and does not specifically address the invention of the ’541 patent. *See id.* Second, we do not view describing an operation as “an important feature” for a specific class of users (“non-specialist consumers”) as a sufficient basis to limit claim language that has broader effect. *See Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1381 (Fed. Cir. 2009) (“[C]laims will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope”); *cf. Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004) (citations and internal quotation marks omitted) (“[P]articular embodiments appearing in the written description will not be used to limit claim language that has broader effect.”). Nor do we view the Specification’s teaching that “[a]ccording to the invention this effect [of wave reflection] is used to control the incorporation and especially

disincorporation of downstream stations into and from the system” as sufficient to limit the broader claim language of “being operated in accordance with presence or absence.” Ex. 1001, 2:16–18; *Martek*, 579 F.3d at 1381. Again, this teaching of incorporation and disincorporation, instead provides an example of an operation performed in accordance with the presence or absence of a station, but the claim is not limited so as to require this particular operation. Ex. 1001, 2:16–18.

In summary, we conclude that “being operated in accordance with presence or absence” broadly covers being operated consistently with the non-detection (presence) or detection (absence) of a reflection of a transmitted signal, rather than requiring a specific operation.

C. Or

The parties dispute whether the “or” in the phrase “presence or absence” means that both presence and absence need to be shown in the prior art, or only one. Because we find below that Petitioner has demonstrated that the prior art teaches being operated in accordance with both presence and absence of the further station, we need not, and thus do not, reach or resolve this dispute. *See, e.g., Nidec*, 868 F.3d at 1017.

V. PRINCIPLES OF LAW

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the

prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of non-obviousness, if present.⁷ *See Graham*, 383 U.S. at 17–18. When evaluating a claim for obviousness, we also must “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

VI. ALLEGED OBVIOUSNESS OVER LEE AND 802.3u

Petitioner argues that the combination of Lee and 802.3u renders claim 1 of the ’541 patent obvious under 35 U.S.C. § 103(a). Pet. 15–33. We have reviewed the parties’ arguments and the evidence of record. For the reasons that follow, we determine that Petitioner shows by a preponderance of the evidence that one of ordinary skill in the art would have found claim 1 obvious over the combination of Lee and 802.3u.

A. Summary of Lee

Lee relates to “detecting link status [of a link] in a computer network where the link and the load at the end of the link have a matched characteristic impedance.” Ex. 1004, code (57). Specifically, Lee teaches that “[t]he first end of the link [(i.e., from where the signal is transmitted)] is analyzed for a reflection signal caused by a mismatch of the characteristic impedance of the link and the termination of the link.” *Id.* In furtherance of this analysis, Lee teaches a link status means for “measur[ing] the amount of signal reflected back from” a transmission line. *Id.* at 8:49–50.

Figure 7, shown below, is a schematic view of Lee’s link status means. *Id.* at 8:9.

⁷ Patent Owner does not present arguments or evidence of such objective evidence of non-obviousness. *See generally* PO Resp.

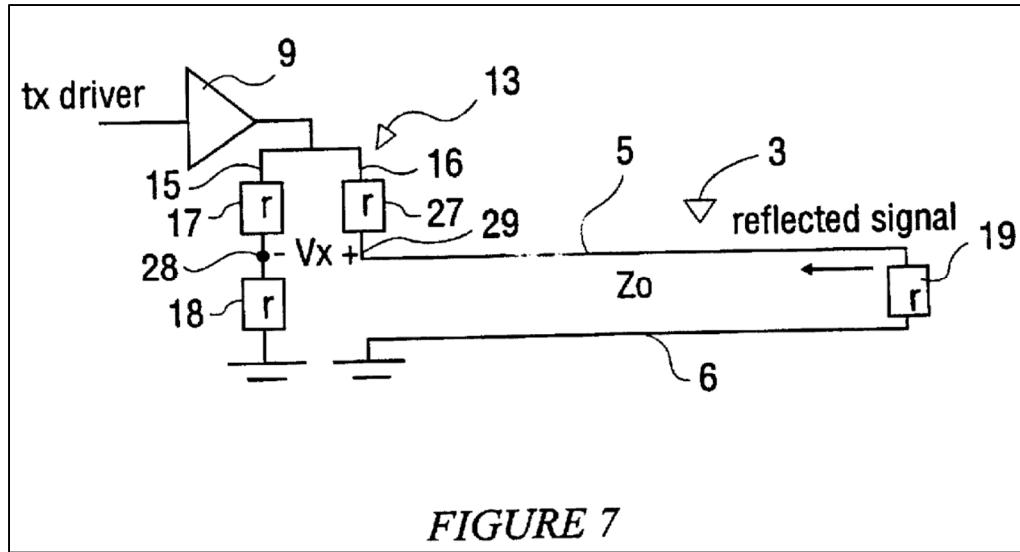


Figure 7 shows a link status circuit for measuring the amount of a transmitted signal that is reflected. *Id.* at 8:9, 8:49–50, 9:2. As shown, the circuit “comprises first and second branches 15 and 16.” *Id.* at 8:55–56. “[F]irst branch [15] includes first and second sensing loads 17, 18 connected in series, and . . . second branch [16] includes sensing load 27 in series with . . . transmission line [3] and load 19.” *Id.* at 8:56–59. Lee teaches that “[e]ach of the sensing loads 17, 18, and 27 hav[e] an impedance which is substantially equal to that of . . . load 19.” *Id.* at 8:59–61. As shown, “first path 5 of . . . transmission line 3 is connected to one end of . . . sensing load 27 . . . and to . . . load 19” on the other end, while “second path 6 of . . . transmission line 3 is connected to ground.” *Id.* at 8:61–65.

Lee teaches that “[a] measurement V_x is taken from . . . point 28 between . . . first and second sensing loads 17, 18, to . . . point 29 in between . . . load 27 and . . . load 19.” *Id.* at 8:66–9:1. According to Lee, “[b]y measuring the difference V_x , the transmitting driver’s voltage will cancel out while any reflected signals will be seen coming from . . . load 19.” *Id.* at 9:9–11. Lee teaches that “[i]f the end of the line is . . . open, all of the reflected signal will go back to the source,” and “[i]f the line is not open . . . ,

a very small, if any, amount of signal is reflected back.” *Id.* at 9:5–9. In accordance therewith, Lee teaches that “[t]he link is identified as satisfactory if the reflection signal represents a substantial match between the characteristic impedance of the link and the characteristic impedance of the termination of the link” (i.e., only a very small, if any, amount of the transmitted signal was reflected). *Id.* at code (57). Otherwise, “[t]he link is identified as defective.” *Id.*

B. Summary of 802.3u

802.3u is an IEEE standard that “is part of a family of standards for local and metropolitan area networks.” Ex. 1005, i, iii. “This family of standards deals with the Physical and Data Link layers as defined by the International Organization for Standardization . . . Open Systems Interconnection Basic Reference Model.” *Id.* at iii. 802.3u recites that these “standards define several types of medium access technologies and associated physical media, each appropriate for particular applications or system objectives.” *Id.*

C. Challenged Claim 1

1. Controlling a Bus Communication System

Petitioner argues that Lee teaches “[a] method of controlling a bus communication system,” as recited in claim 1. Pet. 18–21. More specifically, Petitioner argues that Lee teaches “[a] process for detecting link status in a computer network where the link and the load at the end of the link have a matched characteristic impedance.” *Id.* at 18–19 (citing Ex. 1004, code (57)). Petitioner adds that Lee discloses “control[ling] the bus communication system based on that information.” *Id.* at 19 (citing Ex. 1004, 10:35–45, 12:64–13:3; Ex. 1003 ¶ 60). Furthermore, Petitioner argues that one of ordinary skill in the art would have understood that Lee’s

bus system “allows communication between connected stations.” *Id.* (citing Ex. 1003 ¶ 60); *see also id.* at 20–21 (citing Ex. 1001, 1:6–10, 1:14–21, 2:51–55, Fig. 1; Ex. 1004, 8:23–28, Fig. 4, code (57); Ex. 1003 ¶¶ 62–64) (arguing that Lee “disclose[s] a bus communication system akin to that in the ’541 patent”).

After reviewing Petitioner’s arguments and information, including Dr. Houh’s Declaration, which are not addressed by Patent Owner (*see generally* PO Resp.), we are persuaded that Petitioner demonstrates by a preponderance of the evidence that Lee teaches claim 1’s preamble. In light of this finding, we need not, and thus do not, reach whether claim 1’s preamble is limiting.

2. Connection of a Station to the Bus System

Petitioner argues that Lee and the combination of Lee and 802.3u teach “wherein the connection of a station to the bus system via a connector is detected by transmitting a transmitted wave signal via the connector and splitting of a return wave received at the connector,” as recited in claim 1. Pet. 22–29. First, Petitioner argues that Lee teaches “connecting a station to the bus system.” *Id.* at 22 (citing Ex. 1004, 8:23–28, Fig. 4; Ex. 1003 ¶ 65). Petitioner also argues that one of ordinary skill in the art would have understood that this connection occurs via a connector. *Id.* at 22–23 (citing Ex. 1003 ¶ 65). In support thereof, Petitioner argues that in light of the physical requirements of Lee’s system, a connector necessarily exists “at the point that the transmit line 3 leaves network module 2.” *Id.* (citing Ex. 1004, Fig. 6; Ex. 1003 ¶ 65). Petitioner adds that Lee’s “disclos[ure] that its link can sometimes be ‘open,’” would have indicated to one of ordinary skill in the art that a station “can be connected and disconnected via a connector.” *Id.* at 23 (citing Ex. 1004, 9:3–5; Ex. 1003 ¶ 65).

In addition, Petitioner argues that 802.3u likewise teaches connecting a station to a bus system via a connector. *Id.* at 23–24 (citing Ex. 1005, 129; Ex. 1003 ¶ 66). Petitioner argues that one of ordinary skill in the art would have had reason “to use the connectors specified and shown in [802.3u with Lee’s system] . . . because Lee recites that ‘[t]he method and detection of the present invention can also be used to fulfil[l] the link status requirement of the IEEE 802 standard.’” *Id.* (quoting Ex. 1004, 7:49–51; citing Ex. 1003 ¶ 66).

Second, Petitioner argues that Lee teaches “transmitting a transmitted wave signal via the connector.” *Id.* at 24 (citing Ex. 1003 ¶ 68). According to Petitioner, in Lee’s bus system, “the transmitted wave signal is transmitted out through the transmission line 3, necessarily passing through the connector in order to reach the transmission line.” *Id.* at 24–25 (citing Ex. 1004, 8:30–36; Ex. 1003 ¶ 68).

Third, Petitioner argues that Lee’s “link status means” teaches “splitting of a return wave received at the connector.” *Id.* at 25. More specifically, Petitioner argues that Lee’s “transmitter 9 sends a signal into . . . link status means 13.” *Id.* at 26 (citing Ex. 1004, 8:39–50). Petitioner argues that “link status means 13 carries [the] transmitted signal in its second branch 16 . . . , carries a reference signal in the first branch 15 . . . , and measures the difference between the two at V_x.” *Id.* at 26–27 (citing Ex. 1004, 8:55–9:15, Fig. 7). Lee “is able to distinguish between transmitted and reflected signals because ‘[b]y measuring the difference V_x, the transmitting driver’s voltage will cancel out while any reflected signals will be seen coming from the load 19,’” according to Petitioner. *Id.* at 28 (quoting Ex. 1004, 9:9–11; citing Ex. 1003 ¶ 72); *see also id.* (quoting Ex. 1004, 5:59–60) (“At the point V_x, ***it will not detect signals from the tx***

driver while it will see the reflected signals.”). In other words, “Lee discloses a wave splitter that splits a return wave received at the connector,” Petitioner argues. *Id.* (citing Ex. 1004, Fig. 7; Ex. 1003 ¶ 73).

Lastly, Petitioner argues that “Lee teaches that the return wave signal, which was split by the wave splitter, can be used to determine whether the transmission line is connected or open.” *Id.* at 29 (citing Ex. 1004, 9:3–9). More specifically, Petitioner argues that Lee’s “link status means 13 carries a transmitted signal in its second branch 16 . . . , carries a reference signal in the first branch 15 . . . , and measures the difference between the two at Vx . . . to determine the presence or absence of a reflected wave.” *Id.* at 26–27 (citing Ex. 1004, 8:55–9:15, Fig. 7).

After reviewing Petitioner’s arguments and information, including Dr. Houh’s Declaration, which are not addressed by Patent Owner (*see generally* PO Resp.), we are persuaded that Petitioner demonstrates by a preponderance of the evidence that Lee, as well as the combination of Lee and 802.3u, each teaches “wherein the connection of a station to the bus system via a connector is detected by transmitting a transmitted wave signal via the connector and splitting of a return wave received at the connector.”

3. Bus System Being Operated

We agree with Petitioner and find that Lee⁸ teaches “the bus system being operated in accordance with presence or absence of the further station

⁸ Petitioner argues that the combination of Lee and 802.3u also teaches this element. Pet. 32–33; *see also* Tr. 16:26–18:1 (Petitioner arguing that Lee alone and the combination of Lee and 802.3u teaches this limitation). Because we find that Lee teaches the limitation, we need not, and thus do not, reach whether the combination of Lee and 802.3u teaches the limitation. Likewise, we need not, and thus do not, reach Patent Owner’s argument (PO Resp. 19–20) that Petitioner fails to provide articulated reasoning as to why

dependent on non-detection and detection of a reflection of the transmitted wave signal respectively,” as recited in claim 1. Pet. 30–33; Pet. Reply 7; Pet. Open. Br. 4.

First, as we discuss above, we find that Lee’s link status means evaluates the amount of reflection of a transmitted wave signal to detect whether a load (station) is connected to the bus system via a connector. *See supra* Section VI(C)(2); Ex. 1004, code (57), 8:49–54, 9:3–9, Fig. 8 (showing further station); Ex. 1003 ¶¶ 78–79; Pet. 31. More specifically, Lee teaches that:

The link status means 13 measures the amount of signal reflected back from the transmission line 3. Ideally if the load is properly matched to the transmission line, there will be no reflected signal. If the reflected signal is greater than an acceptable limit, the link status means 13 indicates that the link is defective, preferably along a link status line 14.

Ex. 1004, 8:50–54; Pet. 31–32. In other words, Lee’s teaching that a link is “defective” (which is dependent on detection of a reflected transmit signal due to a mismatched load on the transmission line) teaches a station’s “absence.” *Compare* Ex. 1004, 8:50–54, *with* Ex. 1001, 5:59–6:5 (reciting claim 1). Similarly, Lee’s teaching that a link is “satisfactory” (which is dependent on non-detection of a reflected transmit signal due to a substantially matched load on the transmission line) teaches a station’s “presence.” *See id.* at code (57), 8:50–54; Ex. 1003 ¶¶ 78–79. Put differently, Lee teaches that “[b]y measuring the reflected signal, the status of the line as being satisfactory or defective can be determined.” Ex. 1004, 7:20–21.

one of ordinary skill in the art would have combined Lee and 802.3u to teach the limitation.

Second, we agree with Petitioner and find that Lee's bus system operates in accordance with whether the transmission line is satisfactory (i.e., a station's presence) or defective (i.e., a station's absence). Pet. 30–33; Pet. Reply 7; Pet. Open. Br. 4; Ex. 1004, 8:50–54, 10:35–45, Fig. 8, code (57). More specifically, Lee's Figure 8, shown below, illustrates an example configuration of network modules, in accordance with Lee's invention. Ex. 1004, 8:10–12.

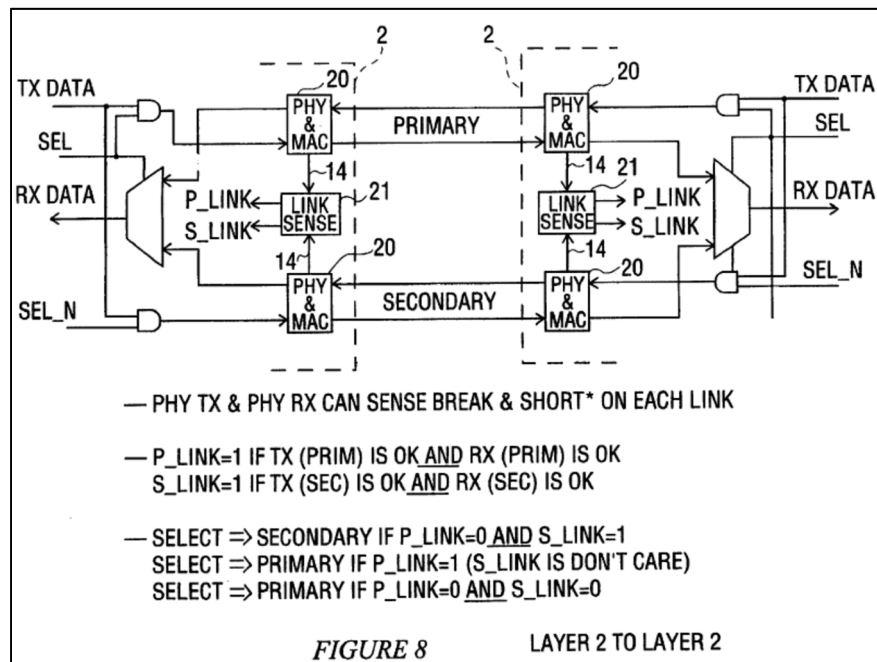


Figure 8 illustrates a “configuration example[] of network modules 2 with primary and redundant, or secondary, links.” Ex. 1004, 10:20–21. Lee teaches that each link (i.e., primary and secondary) (i) includes a transmit line and a receive line (i.e., the two directional lines between the physical modules 20 of the network modules 2 for each link), and (ii) “has its own physical module 20” which contains, *inter alia*, link status means 13. See Ex. 1004, Fig. 8 (showing a transmit line and a receive line for each link), 8:31–33, 10:32–45; Pet. 32; Pet. Reply 7. Lee teaches that:

A link sense module 21 receives the link status line 14 from the physical module 20 and in the preferred embodiment, P_link equals 1 if the primary transmit line is satisfactory and the primary receive line is satisfactory, S_link equals 1 if the secondary transmit line is satisfactory and the secondary receive line is satisfactory. The network module 2 selects the primary link for communication if P_link equals 1 or if P_link equals 0 and S_link equals 0. The network module selects the secondary link for communication if P_link equals 0 and S_link equals 1.

Ex. 1004, 10:35–45. In other words, Lee teaches performing different operations (e.g., setting the value of P_link to 1 or setting the value of P_link to 0) dependent on whether the transmit line and receive line for the link are satisfactory or defective. *Id.*; *see also id.* at Fig. 8 (defining link values and providing selection logic); Pet. 32; Pet. Reply 7. Moreover, when the primary link's receive line is satisfactory, whether the value of P_link is set to 1 is dependent on whether the primary link's transmit line is satisfactory or defective (i.e., whether a station is present or absent on the transmit line dependent on signal reflection). Ex. 1004, 10:35–45, Fig. 8. In other words, when the primary link's receive line is satisfactory, setting the value of P_link to 1 when the primary link's transmit line is satisfactory is an operation dependent on the non-detection of a reflection of a transmit signal (i.e., dependent on a station's presence). *Id.* Similarly, when the primary link's receive line is satisfactory, setting the value of P_link to 0 when the primary link's transmit line is defective is an operation dependent on the detection of a reflection of a transmit signal (i.e., dependent on a station's absence). *Id.* We find that these operations from Lee teach “being operated in accordance with presence or absence” in the context of the limitation, which broadly covers operating consistently with the non-detection (presence) or detection (absence) of a reflection of a transmit signal. *See*

Ex. 1004, 10:35–45, Fig. 8; *supra* Section IV(B) (discussion regarding construction of being operated); Pet. 32; Pet. Reply 7; Pet. Open Br. 6–7.

In addition, Lee teaches other operations that also are in accordance with a station's presence or absence. In particular, Lee teaches that “[t]he network module 2 selects the primary link for communication if P_link equals 1,” which corresponds to a station's presence. Ex. 1004, 10:35–45, Fig. 8; Pet. 32; Pet. Reply 7. On the other hand, Lee teaches not selecting the primary link, and instead “select[ing] the secondary link for communication if P_link equals 0 and S_link equals 1.” Ex. 1004, 10:35–45, Fig. 8. In other words, Lee teaches being operated (i.e., not selecting the primary link for communication, but instead selecting the secondary link) in accordance with the further station's absence on the primary link. Ex. 1004, 10:35–45, Fig. 8. This scenario would occur, for example, when (i) the primary link's transmit line is defective (regardless of the status of the primary link's receive line), and “the secondary transmit line is satisfactory and the secondary receive line is satisfactory.” *Id.*; *see also* Ex. 1004, 12:64–13:3 (claiming similar operations on a link basis that are dependent on a station's presence or absence); Pet. 19.

We also credit Dr. Houh's testimony that “Lee discloses the operation within a bus system with presence or absence of the further station dependent on non-detection and detection of a reflection.” *See* Ex. 1003 ¶ 79 (citing Ex. 1004, 10:35–45, Fig. 8); Pet. 32. And we credit Dr. Houh's testimony that Lee describes that “the P_Link and S_Link variables are determined based on whether reflective waves (or the lack thereof) indicate satisfactory transmit and receive signals for a given link,” and “if both the transmit and receive aspects of the primary link are satisfactory, then only the primary link will be selected for communication.” Ex. 1018 ¶ 15 (citing

Ex. 1004, 10:35–41); Pet. Reply 7. We find this testimony consistent with Lee’s teachings. Ex. 1004, 10:35–45, Fig. 8.

We are not persuaded by Patent Owner’s argument that Lee fails to teach this limitation because Lee is directed to switching over to redundant links, and has no other purpose for its fault detection scheme. PO Resp. 17–18; PO Sur-Reply 1–2. We disagree that Lee’s purpose is so limited. Rather, Lee teaches that “[i]t is an object of . . . [Lee’s] invention to determine computer network link failure without having to transmit a test signal and wait for a time out period in order to determine the status of the link.” Ex. 1004, 3:64–67. Although our focus remains on the claim language, we note that Lee’s objective shares similarities with an objective of the ’541 patent, namely, “it is an object of the invention [of the ’541 patent] to reduce the time that the bus needs to reserve to detect connection and/or disconnection.” Ex. 1001, 1:63–65. Regardless, even if Lee’s purpose was as limited as Patent Owner purports, this does not negate Lee’s teachings discussed above, which include detecting whether a transmit line is satisfactory or defective via a reflected signal on the transmit line, and selecting a satisfactory link for communication. *See* Ex. 1004, 8:50–54, 10:31–45, Fig. 8; *In re Mouttet*, 686 F.3d 1322, 1331 (Fed. Cir. 2012) (“A reference may be read for all that it teaches, including uses beyond its primary purpose.”); *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985) (“A reference must be considered for everything it *teaches* by way of technology and is not limited to the particular *invention* it is describing and attempting to protect.”).

Nor are we persuaded by Patent Owner’s characterization of Lee’s teachings as being focused on “detecting a fault in a transmission line,” as such a characterization does not negate Lee’s teachings of detecting a

station's presence or absence dependent on measuring a reflected transmitted signal. *See, e.g.*, Ex. 1004, 8:50–54, 10:35–45, Fig. 8; PO Resp. 17. Again, in accordance with claim 1, a station's presence or absence, just as in Lee's teachings of whether a line is satisfactory or defective, is dependent on measuring a reflected transmitted signal. *Compare* Ex. 1001, 5:59–6:5, *with* Ex. 1004, 8:50–54, 10:31–45, *and* Fig. 8.

We also are not persuaded by Patent Owner's argument that in Lee "where a connector of one of the redundant links is disconnected, the other redundant link remains connected and thus, the station associated with the one disconnected link is still clearly present on (connected to) the system via the other connected link." PO Resp. 17–18. Likewise, we are not persuaded that "disconnection (absence) of one link in a redundant link topology does not cause the station to be absent from the system." *Id.* at 18. Simply put, claim 1 is directed to detecting the status of an individual connection (i.e., is the further station present or absent for that connector), and operating the bus system in accordance with that determination. *See* Ex. 1001, 5:59–6:5 (claim 1 recites, for example, that "the connection of a station to the bus system via a connector is detected" and "transmitting a transmitted wave signal via the connector and splitting of a return wave received at the connector"), Fig. 1 (showing an individual cable and connector for each station); *see also In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998) (finding "the name of the game is the claim"); *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (stating limitations not appearing in the claims cannot be relied upon for patentability). Whether there is an additional connection between stations is inapposite. *See* Ex. 1001, 5:59–6:5.

We also are not persuaded by Patent Owner's arguments to the extent that they are contrary to our conclusions regarding claim construction. For

example, we are not persuaded by Patent Owner’s arguments relating to whether Lee teaches a “physical,” “complete,” or “at will” connection or disconnection. PO Resp. 19; PO Open Br. 1, 3–4. Nor are we persuaded by Patent Owner’s arguments requiring Lee to teach logically incorporating or disincorporating the further station to render claim 1 unpatentable. *See* PO Open. Br. 2–3, 5; PO Resp. Br. 4–5. These arguments are contrary to our conclusions regarding the construction of claim 1, and thus, are not persuasive. *See supra* Section IV(A)–(B) (discussing construction of claim 1); *Self*, 671 F.2d at 1348.

We also are not persuaded by Patent Owner’s argument “[t]hat the system of Lee treats a fault in just one of the transmit line or receive line as being exactly the same as a fault in both the transmit and receive lines shows that the system of Lee is indifferent to and **unable** to be aware about the presence or absence of the further station.” PO Sur-Reply 5; *see also id.* at 3 (making a similar argument). As we discuss above, Lee teaches that “link status means 13 is positioned in between the transmitter 9 and the transmit line 3” and “measures the amount of signal reflected back from the transmission line 3.” *See* Ex. 1004, 8:47–50, Fig. 6; Pet. 26. Lee also teaches that link status means 13 indicates “that the *link* is defective,” “[i]f the reflected signal is greater than an acceptable limit.” *See* Ex. 1004, 8:50–54 (emphasis added), Fig. 6; Pet. 26. As such, Lee’s link status means 13 is able to determine a station’s presence or absence, which depends on whether there is a reflected transmitted wave signal. *See* Ex. 1004, 8:50–54, Fig. 6. The fact that Lee’s embodiment illustrated in Figure 8 includes links having both a transmit and receive line does not change how the claim defines presence or absence (i.e., being based on measuring a reflection of a “transmitted wave signal”), or Lee’s other teachings. *See* Ex. 1004, 10:35–

45, Fig. 8; Ex. 1001, 5:59–6:5. Patent Owner incorrectly conflates Lee’s teachings regarding detecting whether a line is satisfactory or defective with Lee’s teachings of setting values for P_link and S_link, and selecting a link for communication. *Compare* Ex. 1004, 8:50–54, *with id.* at 10:35–45 and Fig. 8.

We also are not persuaded by Patent Owner’s argument that “[d]ependence on other variables such as reflection of a different transmitted wave is simply not consistent with the repeated teaching in the [S]pecification of presence or absence depending only on non-detection or detection.” PO Resp. Br. 2; *see also* PO Open Br. 3–5 (arguing that Lee does not teach “the claimed dependent relationship between P_link and non-detection ‘of a reflection of the transmitted wave signal’”). As we discuss above, when the primary link’s receive line is satisfactory, whether the value of P_link is set to 1 or 0, and whether the primary link is selected for communication, is dependent on whether the primary link’s transmit line is satisfactory or defective (i.e., whether a station is present or absent dependent on signal reflection on the transmit line). *See* Ex. 1004, 10:35–45, Fig. 8. This scenario in Lee is sufficient to teach this limitation because “combinations of prior art that sometimes meet the claim elements are sufficient to show obviousness.” *See Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002 (Fed. Cir. 2016). Thus, Lee teaches being operated in accordance with presence or absence of the further station. In addition, we find inapposite Patent Owner’s argument that, “in the system of Lee, the network module [also] will choose the primary communications link even when P_link equals 0 and S_link equals 0.” PO Sur-Reply 5. This teaching in Lee is an additional operation, which does not negate Lee’s teachings discussed above regarding setting the value of P_link or selecting a link for

communication for scenarios where P_link and S_link do not both equal 0.
See Ex. 1004, 10:35–45, Fig. 8.

We also are not persuaded by Patent Owner’s argument that Petitioner improperly relies on “new theories not presented in its Petition” regarding Lee’s teachings for this limitation. PO Open. Br. 6–7. In making this argument, Patent Owner overlooks Petitioner’s Reply which responds to arguments made by Patent Owner in its Response and to issues in our Decision on Institution about this limitation, which is allowed by our Rules. *See* PO Resp. 16–19; Dec. on Inst. 19–20; 37 C.F.R. § 42.23(b); Consolidated Trial Practice Guide November 2019 (“CTPG”), 73 (“[T]he Board will permit the petitioner, in its reply brief, to address issues discussed in the institution decision.”), 74; *see also* Pet. 32 (making initial argument). Moreover, we authorized additional briefing (opening and responsive briefs from each party) directed to the meaning of this limitation and the effect of the meaning on the unpatentability issues before us. *See* Order Add. Br. 2–3. Notably, Patent Owner does not argue that Petitioner’s Responsive Post-Hearing Brief raises new theories.

After reviewing the parties’ arguments, and Dr. Houh’s Declarations, we are persuaded that Petitioner demonstrates by a preponderance of the evidence that Lee teaches “the bus system being operated in accordance with presence or absence of the further station dependent on non-detection and detection of a reflection of the transmitted wave signal respectively.”

4. Summary

In summary, based on the arguments and evidence of record, we find that Petitioner has demonstrated by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) over the combination of Lee and 802.3u.

VII. ALLEGED OBVIOUSNESS OVER USB 1.1 AND MORRIS

Petitioner argues that claim 1 is unpatentable over the combination of USB 1.1 and Morris. Pet. 33–48. Thus, this ground of unpatentability challenges the same claim we already determine is unpatentable over the combination of Lee and 802.3u. *See supra* Section VI (determining Petitioner shows that claim 1 is unpatentable). Under the circumstances of this case, analyzing an additional ground challenging the same claim, which we have determined to be unpatentable, is not necessary. *See Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (“We agree that the Board need not address issues that are not necessary to the resolution of the proceeding.”).

Accordingly, we do not reach this remaining obviousness ground. *Cf. In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009) (not reaching other grounds of unpatentability after affirming the anticipation ground); *see also Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (determining once a dispositive issue is decided, there is no need to decide other issues).

VIII. CONSTITUTIONAL CHALLENGE

Patent Owner argues that Administrative Patent Judges are unconstitutionally appointed principal officers, and that the decision in *Arthrex, Inc. v. Smith & Nephew, Inc.*, 941 F.3d 1320, 1337 (Fed. Cir. 2019), *cert. granted sub nom. United States v. Arthrex, Inc.*, 2020 WL 6037206 (Oct. 13, 2020), was impermissible and insufficient to cure the Constitutional violation. PO Resp. 27–30. We note that Patent Owner’s constitutional challenge was addressed by the Federal Circuit’s *Arthrex* decision. *Arthrex*, 941 F.3d at 1337 (“This as-applied severance . . . cures

the constitutional violation.”); *see also Arthrex, Inc. v. Smith & Nephew, Inc.*, 953 F.3d 760, 764 (Fed. Cir. 2020) (en banc) (Moore, J., concurring in denial of rehearing) (“Because the APJs were constitutionally appointed as of the implementation of the severance, *inter partes* review decisions going forward were no longer rendered by unconstitutional panels.”).

Accordingly, we do not consider this issue any further.

IX. CONCLUSION⁹

Based on the full record, we determine that Petitioner shows by a preponderance of the evidence that claim 1 of the ’541 patent is unpatentable under 35 U.S.C. § 103(a) in view of the combination of Lee and 802.3u.

Claim(s)	35 U.S.C. §	Reference(s) /Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1	103(a)	Lee, 802.3u	1	
1	103(a)	USB 1.1, Morris ¹⁰		
Overall Outcome			1	

⁹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

¹⁰ As we explain above, because we determine that claim 1 is unpatentable over Lee and 802.3u, we decline to address this ground.

X. ORDER

In consideration of the foregoing, it is hereby

ORDERED that, pursuant to 35 U.S.C. § 314(a), Petitioner has shown by a preponderance of the evidence that claim 1 of the '541 patent is unpatentable; and

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

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