

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONOS, INC.,
Petitioner,

v.

GOOGLE LLC,
Patent Owner.

IPR2021-00964
Patent 10,229,586 B2

Before KEVIN F. TURNER, TERRENCE W. MCMILLIN, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

RAEVSKY, *Administrative Patent Judge*.

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

I. INTRODUCTION

Sonos, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–5, 7–12, 14–16, 18, and 20 of U.S. Patent No. 10,229,586 B2 (Ex. 1001, “the ’586 patent”). Pet. 1. Google LLC (“Patent Owner”) filed a Preliminary Response (Paper 6). Based on these and other preliminary submissions, we instituted an *inter partes* review of claims 1–5, 7–12, 14–16, 18, and 20 (Paper 7, “Decision” or “Dec.”). Subsequent filings include a Patent Owner Response (Paper 11, “PO Resp.”), a Petitioner Reply (Paper 14, “Reply”), and a Patent Owner Sur-reply (Paper 17, “Sur-reply”). An oral hearing was held on July 18, 2022, and a copy of the transcript was entered into the record. Paper 21 (“Tr.”).

We have jurisdiction over this proceeding under 35 U.S.C. § 6(b). After considering the evidence and arguments of the parties, we determine that Petitioner has proven by a preponderance of the evidence that claims 1–5, 7–12, 14–16, 18, and 20 of the ’586 patent are unpatentable. *See* 35 U.S.C. § 316(e). We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a).

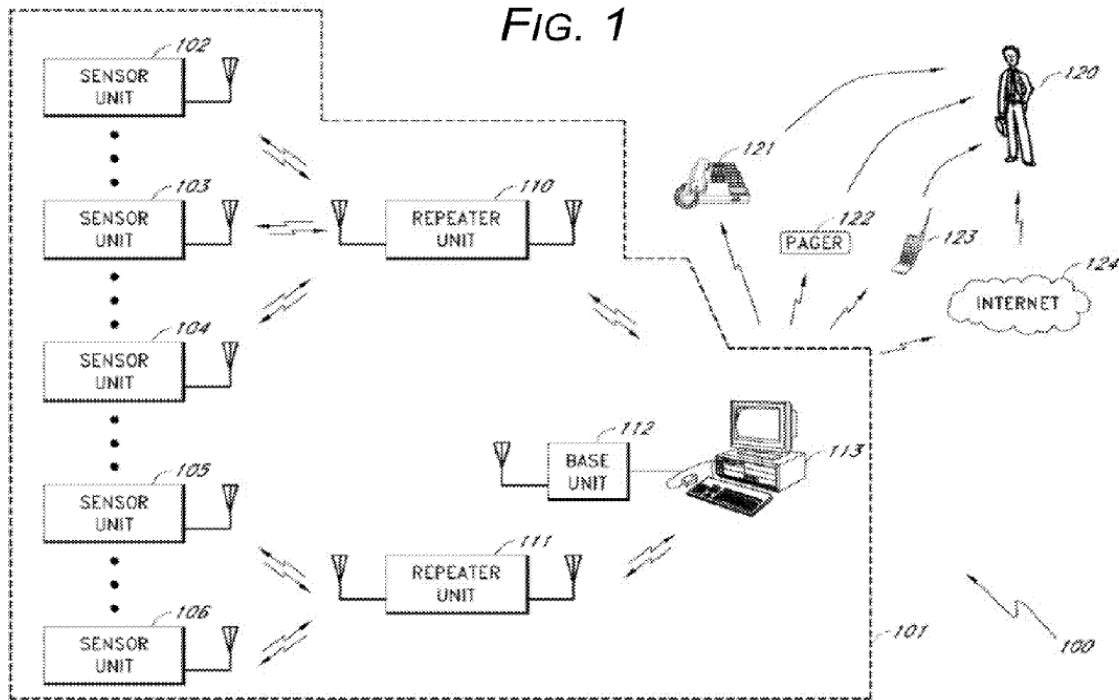
II. BACKGROUND

A. *Related Matters*

The parties identify the following related district court litigation: *Google LLC v. Sonos, Inc.*, No. 3:20-cv-03845 (N.D. Cal. June 11, 2020). Pet. 4; Paper 5, 2.

B. *The ’586 patent*

The ’586 patent describes “a wireless sensor system.” Ex. 1001, 2:8–10. Figure 1, reproduced below, depicts an example of this system:



Id. at 4:13–15. Figure 1 shows a system that includes sensor units that communicate with a base unit through repeater units. *Id.* Sensors 102–106 measure conditions like smoke, temperature, moisture, and carbon monoxide. *Id.* at 4:60–65. The sensors wirelessly communicate with repeaters 110, 111. *Id.* at 4:37–40. The repeaters in turn communicate with base unit 112 and monitoring computer system 113. *Id.* at 4:39–40. When sensors 102–106 detect smoke, fire, water, or some other condition, they communicate with a repeater 110, 111, which forwards data to base unit 112 and computer 113. *Id.* at 5:26–32.

Figure 5 depicts an example communication packet used by sensors 102–106, repeaters 110–111, and base unit 112:

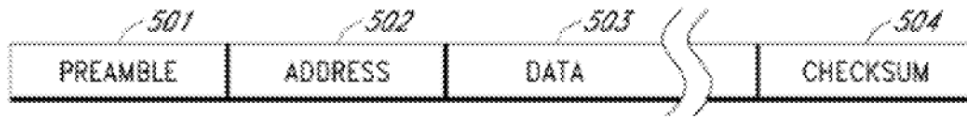


FIG. 5

Id. at 4:19–21. The packet includes preamble portion 501, address (or ID) portion 502, data payload portion 503, and integrity portion 504 (which can include a checksum). *Id.* at 11:1–6.

C. Challenged Claims

Petitioner challenges claims 1–5, 7–12, 14–16, 18, and 20 of the ’586 patent. Pet. 1. Claim 1 is illustrative:¹

1. [1-p] An audio-enabled wireless device configured for bidirectional wireless communication in a wireless mesh network, the wireless device comprising:

[1-1] a wireless transceiver;

[1-2] an audio output element;

[1-3] a reset element; and

[1-4] a controller operatively coupled to the wireless transceiver, the audio output element, and the reset element, the controller being configured to:

[1-5] receive a communication packet using the wireless transceiver, the communication packet including a preamble portion, an identification code portion, a data payload portion, and an integrity portion;

[1-6]² compare at least the identification code portion of the received communication packet to a table of identifiers stored in the audio-enabled wireless device;

¹ For convenience, we use Petitioner’s element labeling. *See* Pet. 34–44.

² Petitioner uses “[1-6]” to group multiple limitations. Pet. at 44.

based on the comparison of the identification code portion of the received communication packet matching an entry in the table of identifiers stored in the audio-enabled wireless device, determine to relay the communication packet to another audio-enabled wireless device; and

relay the communication packet to the other audio-enabled wireless device.

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 7):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 5, 8–9, 14–15	103(a) ³	Baker ⁴ alone ⁵ or Baker and Bruckert ⁶
2–4, 7, 10–12, 16, 18, 20	103(a)	Baker, Bruckert, and McMillin ⁷

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102, 103 effective March 16, 2013. Because the challenged patent claims priority to applications filed before March 16, 2013, we refer to the pre-AIA version of §§ 102, 103. The parties do not dispute that the pre-AIA versions of these statutes apply. Our opinions on this record would not change if the AIA versions of §§ 102, 103 were to apply.

⁴ U.S. Patent Pub. No. 2006/0120433 A1 to Baker et al. (“Baker”) (Ex. 1004).

⁵ Petitioner’s grounds summary refers only to obviousness over Baker and Bruckert, Pet. 6–7, but Petitioner also asserts obviousness over Baker alone (except for claims 8 and 14, which Petitioner argues over “Baker and Bruckert together”), *id.* at 34–47.

⁶ European Patent No. 0416732 B1 to Bruckert et al. (“Bruckert”) (Ex. 1009).

⁷ U.S. Pub. No. 7,027,773 B1 to McMillin (“McMillin”) (Ex. 1018).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–5, 7–12, 14–16, 18, 20	103(a)	Marman ⁸ alone ⁹ or Marman and Shoemake ¹⁰

Petitioner relies on the declarations of Dr. Stephen B. Wicker (Exs. 1003, 1028), and Patent Owner relies on the declaration of Dr. Vijay K. Madiseti (Ex. 2006).

III. ANALYSIS

A. Principles of Law

Petitioner bears the burden to demonstrate unpatentability, and that burden never shifts to the patentee. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is unpatentable as obvious if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a)). We resolve the question of obviousness based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the prior art and the claims; (3) the level of skill in the art; and (4) any secondary considerations or objective

⁸ PCT Pub. No. WO 00/21053 to Marman et al. (“Marman”) (Ex. 1006).

⁹ Petitioner’s grounds summary refers only to obviousness over Marman and Shoemake, Pet. 6–7, but Petitioner also asserts obviousness over Marman alone, *id.* at 58–66.

¹⁰ U.S. Pub. No. 2002/0122413 A1 to Shoemake (“Shoemake”) (Ex. 1010).

evidence of nonobviousness.¹¹ *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

We apply these principles to the Petition’s challenges.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 13, 17. Petitioner asserts that

[a] POSITA [person of ordinary skill in the art] . . . would have had a degree in computer engineering, computer science, or a similar discipline, along with two years of professional experience developing wireless sensor systems or an equivalent level of skill, knowledge, and experience. . . . This POSITA would be aware of and generally knowledgeable about the types of components found in wireless networks, communication protocols, packet structure, and industry standards and best practices that were known and available at the time the ’586 patent was filed.

Pet. 33 (citing Ex. 1003 ¶¶ 39–41).

Patent Owner argues that some aspects of Petitioner’s definition are unclear:

It is unclear from Petitioner’s definition whether a POSITA could obtain the requisite qualifications through education or experience because it is unclear what part of the phrase “or an equivalent level of skill, knowledge, and experience” modifies. Ex. 2006, ¶¶ 29-31. It is also unclear why the POSITA would have had to have worked “developing wireless sensor systems” when knowledge of such systems could be acquired in other ways.

¹¹ Patent Owner has not submitted any objective evidence of nonobviousness.

PO Resp. 7. Patent Owner therefore proposes an alternative definition of the level of ordinary skill:

Accordingly, a POSITA at the time of invention of the '586 patent would have held a bachelor's degree in electrical engineering, computer science, or a similar discipline, or at least two years of professional or research experience in the fields of computer hardware and software, wireless networking, or an equivalent subject matter.

Id. (citing Ex. 2006 ¶¶ 29–31).

We are persuaded, on the present record, that Petitioner's proposal is consistent with the problems and solutions in the '586 patent and prior art of record. Patent Owner's level of skill definition states that two years of experience can replace a four-year degree, but Patent Owner does not explain how two years of experience could replace a college degree in electrical engineering, computer science, or a similar discipline. We therefore adopt Petitioner's definition of the level of skill. However, had we adopted Patent Owner's level of skill, we would not have reached a different result as to the overall issue of patentability in this case.

C. Claim Construction

In *inter partes* review, we construe claims using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b) (2020).

In the Petition, Petitioner argues that the independent claim preambles are not limiting and proposes constructions for two terms: “reset element” and “preamble portion.” Pet. 18–22. At institution, we discussed the

meaning of the term “preamble portion.” Dec. 12, 27. Post-institution, neither party disputes the meaning of any claim terms. PO Resp. 7; *see generally* Reply.

Based on our review of the record, no terms need to be construed. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms that are in controversy, and only to the extent necessary to resolve the controversy.”) (internal quotation omitted).

D. Asserted Obviousness over Baker alone or Baker and Bruckert

Petitioner contends that claims 1, 5, 8–9, and 14–15 would have been obvious over Baker alone or over Baker and Bruckert. Pet. 33–52.

1. Overview of Baker

Baker describes a wireless home network including consumer electronic devices like televisions, cable boxes, and audio systems, as shown below in Figure 3a. Ex. 1004 ¶ 60. Figure 3b, also shown below, depicts a “simplified schematic” of this network with four nodes 350, 352, 354, 356. *Id.* ¶ 61.

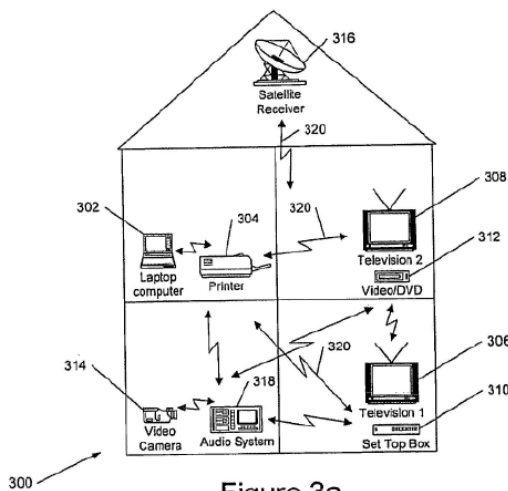


Figure 3a

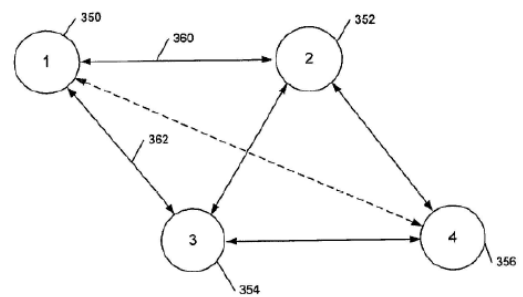


Figure 3b

In Figure 3a above, example nodes in the network include laptop computer 302, printer 304, televisions 306, 308, and set top box 310, among others.

Id. ¶ 60. Each node, as represented in Figure 3b, is in communication with each other node, except nodes 350 and 356, which are out of range of one another (as indicated by the dashed line). *Id.* ¶ 61. If nodes 350, 356 wish to communicate, the communication must be routed via either node 352 or node 354. *Id.*

This routing may be performed as follows. A node may receive a data packet from another node and determine whether the node is the final intended destination of the packet. *Id.* ¶ 84. If the node is not the final intended destination, an incoming channel number and destination address of the packet are used to look up an outgoing port and channel number in a locally stored connection table. *Id.* ¶ 85. If a table entry specifies a valid port and channel number, the node updates the packet channel number field and retransmits the packet, thus forwarding the packet. *Id.*

2. Overview of Bruckert

Bruckert describes a method and system of resetting a data processing system without altering the sequence of instructions of the steps executed by the data processing system. Ex. 1009, 2:11–14. This system includes a “single reset” that always sets the processor back to some predetermined or initial state. *Id.* at 35:21–23. The reset can be used for standard functions, such as when power is initially applied to the system. *Id.* at 35:17–21.

3. *Independent Claim 1*

a. *Undisputed Limitations*

Petitioner contends that Baker alone or Baker and Bruckert disclose the preamble 1-p and limitations 1-1 through 1-3 and 1-5. Pet. 34–40, 42–44. Patent Owner does not dispute these contentions.

Petitioner supports its arguments with specific citations to Baker and Bruckert and Dr. Wicker’s declaration. *Id.* (citing, e.g., Ex. 1004, *passim*; Ex. 1003 ¶¶ 234–276, 285–302). We agree with Petitioner that Baker alone or Baker and Bruckert disclose the preamble 1-p and limitations 1-1 through 1-3 and 1-5. We thus need not discuss Petitioner’s arguments on these limitations in detail. *See LG Elecs., Inc. v. Conversant Wireless Licensing S.A.R.L.*, 759 F. App’x 917, 925 (Fed. Cir. 2019) (nonprecedential) (“The Board is ‘not required to address undisputed matters’ or arguments about limitations with which it was never presented.”) (quoting *In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016)). We also need not determine whether the preamble is limiting because even if it were, we determine that Petitioner has shown that Baker discloses it.

b. *[1-4] a controller operatively coupled to . . . the reset element*

Petitioner contends that Baker’s devices include a “device controller.” Pet. 40 (citing Ex. 1004 ¶¶ 38–40). This controller is “operatively coupled” to a “wireless transceiver” and “audio output element,” Petitioner asserts. *Id.* at 41 (citing Ex. 1003 ¶¶ 277–282). Petitioner further contends that “[w]hile Baker does not expressly reference a ‘reset element,’ it would have been obvious to include this element.” *Id.* (citing Pet. § VII.C.1.[1-3]; Ex. 1003 ¶¶ 283–84). According to Petitioner, Baker’s network includes devices

that can be “switch[ed] on and off.” *Id.* at 37 (citing Ex. 1004 ¶¶ 24, 61). Thus, Petitioner contends, “a POSITA would have understood that Baker’s network devices include a ‘reset element’ that returns the devices to a ‘predetermined’ state: each device includes a hardware switch/button allowing the device to power cycle.” *Id.* (citing Ex. 1003 ¶¶ 251–56).

Petitioner also relies on Bruckert’s disclosure of a reset, contending that “[a] POSITA would have considered it highly obvious to include similar functionality in each of Baker’s UWB devices.” *Id.* at 38–40 (citing, e.g., Ex. 1009, 1:7–10 (“[a]ll data processing systems need the capability of resetting under certain conditions”), 35:21–23 (“[m]ost systems’ also have [a] ‘single reset which always sets the processor back to some predetermined or initial state’”); Ex. 1003 ¶¶ 259–76). And “[b]ecause Baker’s devices can be turned on/off,” Petitioner argues, “a POSITA would have understood that they already include this same reset functionality.” *Id.* (citing Ex. 1003 ¶¶ 270–71). Finally, Petitioner contends that “a POSITA would understand that it would be beneficial to incorporate the reset functionality of Brucker[t] to return Baker’s devices to an initial state to facilitate either addition to the network, or removal from the network and later use elsewhere.” *Id.* at 40 (citing Ex. 1003 ¶¶ 274–75).

Patent Owner disputes that the combination of Baker and Bruckert discloses “a controller operatively coupled to . . . the reset element.” PO Resp. 15. In Patent Owner’s view, “Petitioner never identifies where Baker or Bruckert discloses the controller operatively coupled to the reset element, nor does Petitioner explain why this feature would have been obvious in view of the prior art.” *Id.* (citing Pet. 40–41). Patent Owner asserts that Petitioner “only alleges that it would have been obvious to ‘include’ the

reset element” but says nothing about where Baker or Bruckert teaches that the “controller [is] operatively coupled to . . . the reset element.” *Id.* at 16 (citing Pet. 37–41; Ex. 2006 ¶¶ 52–53).

In Reply, Petitioner first notes that “Patent Owner does not dispute that the art teaches devices that include the claimed ‘reset element.’” Reply 8. Petitioner argues that Patent Owner has taken the position that the prior art’s reset element, “while present, could be floating, unconnected, and purposeless.” *Id.* To the contrary, Petitioner contends, “[t]he art makes clear that a ‘reset element’ is connected so as to allow the entire device, including the device’s controller, to be reset.” *Id.* For example, Petitioner asserts, “Baker teaches that each of its devices can be power cycled in their entirety,” and Bruckert teaches that a reset “‘set[s] a device’s ‘processor back to some predetermined or initial state.’” *Id.* (citing Ex. 1004 ¶¶ 24, 61; Ex. 1009, 35:21–23). Thus, Petitioner argues, “the reset element is not only present, but is connected to and impacts the operation of a device’s processor/controller.” *Id.* Finally, Petitioner points to two instances in which the Petition argues for “a controller operatively coupled to . . . the reset element,” namely describing (1) Baker’s “reset element” that “**causes the device’s controller to reset** its configuration,” and (2) Bruckert’s teaching that “**a controller can be reset** in numerous ways.” *Id.* (citing Pet. 37, 39). Patent Owner’s Sur-reply does not respond to these arguments.

We agree with Petitioner that the Petition establishes not only that Baker alone or Baker and Bruckert “include” a reset element, but also that Baker alone or Baker and Bruckert disclose “a controller operatively coupled to . . . the reset element,” alone and in combination. *See* Pet. 37, 39. We determine that Baker’s disclosure of “switching on and off” network

devices would have been understood by a POSITA to be a reset operatively coupled to a controller of such devices because (1) switching on or off a device constitutes resetting, and (2) the device that resets would be in communication with, i.e., coupled with, a controller of that device. *See* Ex. 1004 ¶ 24; Ex. 1003 ¶¶ 251–58. We likewise determine that Bruckert’s “single reset which always sets the processor back to some predetermined or initial state” also discloses “a controller operatively coupled to . . . the reset element” because the reset must be in communication with, i.e., coupled with, the processor in order to reset the processor. *See* Ex. 1009, 35:21–23. Finally, we agree with Petitioner that a POSITA would have understood that “it would be beneficial to incorporate the reset functionality of Brucker[t] to return Baker’s devices to an initial state to facilitate either addition to the network, or removal from the network and later use elsewhere.” Pet. 40 (citing Ex. 1003 ¶¶ 274–75).

Thus, Baker alone and the combination of Baker and Bruckert disclose this limitation.

c. [1-6] compare at least the identification code portion of the received communication packet to a table of identifiers stored in the audio-enabled wireless device;

based on the comparison of the identification code portion of the received communication packet matching an entry in the table of identifiers stored in the audio-enabled wireless device, determine to relay the communication packet to another audio-enabled wireless device; and

relay the communication packet to the other audio-enabled wireless device

Petitioner contends that Baker discloses limitations 1-6 of claim 1. Pet. 44–47. According to Petitioner, Baker’s communication packets are relayed from one audio-enabled device to another. *Id.* at 45 (citing Ex. 1003 ¶¶ 303–309). To perform this relaying, Petitioner asserts, Baker’s approach is to employ “local routing tables.” *Id.* at 45–46 (citing Ex. 1004 ¶¶ 30, 27, 31, 34). These tables include “an identifier that uniquely identifies the (bi-directional) path through the network,” namely, “a paired source-destination MAC address.” *Id.* at 46 (citing Ex. 1004 ¶ 76, Fig. 11d). Petitioner contends that a packet’s incoming channel number and destination address are used to look up an outgoing port and channel number in a table. *Id.* (citing Ex. 1004 ¶ 85). If a destination is identified, Petitioner asserts, the node relays the packet and subsequently “retransmits the packet . . . thus forwarding the packet along the next link in the chain.” *Id.* (citing Ex. 1004 ¶ 85); *see also* Ex. 1003 ¶¶ 310–317.

Patent Owner contends that “Baker’s lookup operation is only concerned with **how** to relay a packet, not **determining** to relay it in the first place.” PO Resp. 10 (citing Ex. 2006 ¶ 44). According to Patent Owner,

Baker’s lookup operation “does not compare the specific information recited in the claim—the ID code portion of the packet—to an identifier in the table and use a **match between them** as a basis for determining to relay the packet.” *Id.* at 10–11 (citing Ex. 2006 ¶ 45). In Patent Owner’s view, except in two instances in Baker, the “compare at least the identification portion” as claimed “could not even occur.” *Id.* at 11 (citing Ex. 2006 ¶ 47). “This is because in these embodiments, device addresses are not stored in the routing table.” *Id.* (citing Ex. 1004 ¶ 30). Addresses are not stored in the table in these embodiments “because the intermediary devices (e.g., repeaters) in Baker ‘need only be locally aware,’” Patent Owner contends. *Id.* at 12 (citing Ex. 1004 ¶ 27).

Patent Owner acknowledges that Baker refers twice to the local routing table including a destination address, but argues that “in neither of those instances does a **match** between the ID code portion of the incoming packet and the stored destination media access control (‘MAC’) address form the basis for a **determination to relay** the incoming packet.” *Id.* at 12–13 (citing Ex. 1004 ¶¶ 30, 76; Ex. 2006 ¶ 48). Specifically, Patent Owner asserts, “[i]n the first instance, Baker explains that although ‘an identifier for the intended end recipient’ may be stored in the table, ‘in embodiments this is not necessary because a message containing an identifier for the intended recipient is always forwarded.’” *Id.* at 13 (Ex. 1004 ¶ 30). In the second instance, Patent Owner argues, “Baker explains that the destination MAC address instead informs the determination of **which outgoing channel** should be used—not determining that the packet **should be relayed** at all.” *Id.* 14 (citing Ex. 1004 ¶ 76 (“a destination MAC address may be included in the connection table so that an incoming channel

and destination determine an outgoing channel for retransmission of a packet”); Ex. 2006 ¶ 50). Finally, Patent Owner contends, there is no determination in Baker made to relay based on a match. *Id.* at 14–15. According to Patent Owner, “[t]his is because Baker is focused on **how** to relay the packet (i.e., which channel and/or port to use)—not **determining to relay the packet**—because Baker does not employ the type of selective relay disclosed and claimed in the ’586 patent.” *Id.* at 14–15 (citing Ex. 2006 ¶ 50).

In the Reply, Petitioner argues that it does not matter if some embodiments of Baker’s table do not include identifiers. Reply 3. Instead, “all that matters is that there *are* embodiments where a table of identifiers is used to make a packet forwarding determination.” *Id.* (citing *In re Mouttet*, 686 F.3d 1322, 1332–33 (Fed. Cir. 2012) (Obviousness is assessed by considering all that a reference teaches.)). Petitioner asserts that “Patent Owner concedes that in at least some embodiments, Baker employs a lookup table that it uses to determine how to handle an incoming packet.” *Id.* (citing PO Resp. 12).

Petitioner also disputes that Baker teaches that it is “predetermined that the packet is always going to be relayed if possible.” *Id.* In Petitioner’s view, Baker’s statement that a packet “is always forwarded (if it can be)” admits the possibility that a packet may not be forwarded, thus foreclosing Patent Owner’s interpretation that packet forwarding is predetermined. *Id.* at 4 (quoting Ex. 1004 ¶ 30). Instead, Petitioner argues, Baker discloses tables that store channel numbers or “a paired source-destination MAC address,” which it uses to determine how to handle incoming packets. *Id.*

(citing Ex. 1004 ¶¶ 76, 84–85). To explain this process, Petitioner submits the following annotated version of Baker Figure 13:

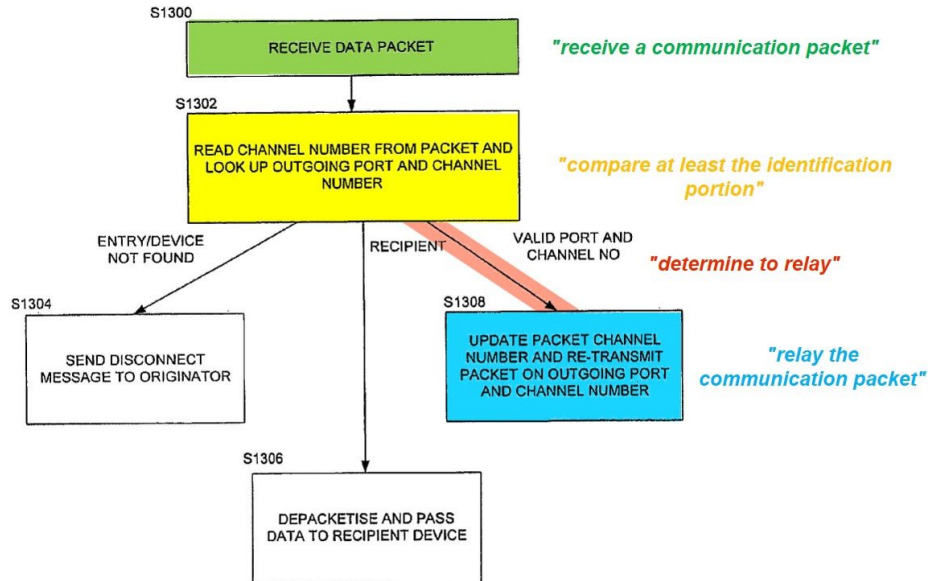


Figure 13

Id. at 5.

According to Petitioner, Figure 13 above shows the “procedure . . . implemented at a store and forward node . . . and at a packet destination node of the network.” *Id.* (citing Ex. 1004 ¶ 84). Petitioner contends that in this Figure, “Baker teaches that its network nodes do in fact make a determination regarding whether to forward a packet.” *Id.* at 6. Specifically, Petitioner contends, if a match is found in the table, the packet is relayed (step S1308), but if no match is found, the packet is not relayed (step S1304). *Id.* In Petitioner’s view, “Patent Owner completely ignores this operation and appears to assume that Baker will always, and in all cases, proceed to packet forward option S1308 and never proceed to option S1304.” *Id.*

In addition, Petitioner asserts that “Baker also teaches that ‘paired MAC addresses’ can be used in place of ‘a channel number.’” *Id.* at 7 (citing Ex. 1004 ¶¶ 76, 84–85). And Petitioner contends, “Baker also explains that the lookup procedure in Figure 13 can employ ‘destination address’ information in an incoming packet.” *Id.* Petitioner asserts, “[i]t is these combined teachings—which Dr. Madisetti apparently ignored—and not Figure 13 standing alone and in isolation that render[] the claims obvious.” *Id.*

In the Sur-reply, Patent Owner responds that Figure 13 of Baker “is dedicated to finding the appropriate channel upon which to forward all the incoming data it can,” and thus Baker has “no reason to condition a packet relay determination on a **match**” between an address and a routing table entry. Sur-reply 3 (citing Ex. 1004 ¶¶ 27–29). Patent Owner charges Petitioner with manufacturing the claimed determination “from the mere fact that in some embodiments a comparison occurs between a MAC address in the packet and a destination address in the routing table.” *Id.* at 4 (citing Reply 5–6). This isn’t enough, Patent Owner urges, because “the claim requires more than just this comparison; it requires **both** a match **and** that the determination to relay is **based on that match.**” *Id.* Baker, Patent Owner argues, conditions packet retransmission on a different basis— “[w]here the table entry specifies a valid port and channel number.” *Id.* at 4–5 (citing Ex. 1004 ¶ 85). And according to Patent Owner, “[b]asing retransmission on the existence of valid routing information” does not disclose the disputed relaying limitation. *Id.* at 5.

Turning to our analysis, we agree with Petitioner, whose arguments are supported by evidence and a rationale underpinning. Patent Owner, on

the other hand, downplays the most relevant disclosure in Baker. But obviousness is assessed by considering all that a reference teaches. *See In re Mouttet*, 686 F.3d 1322, 1332–33 (Fed. Cir. 2012). It is not the case that Baker always forwards packets, and it is not the case that Baker’s disclosure of identifiers in its lookup tables is irrelevant. Petitioner’s argument, as supported by Dr. Wicker’s testimony and the teachings of Baker, persuades us that Baker does indeed disclose the disputed limitation.

To begin with, we find the following disclosures of Baker, relied on by Petitioner, to be relevant. First, Baker teaches that “[o]ptionally the routing table may further include, for each link defined by a pair of channels for incoming and outgoing data, *an identifier for the intended end recipient.*” Ex. 1004 ¶ 30 (emphasis added); Pet. 45–46 (citing same); Reply 4 (citing same). Patent Owner draws our attention to the rest of this passage, which states, “in embodiments this is not necessary because a message containing an identifier for the intended recipient is always forwarded.” *Id.*, quoted in PO Resp. 13. But Patent Owner’s suggestion that the latter half of this passage undermines the former is simply wrong. *See* PO Resp. 13. We cannot ignore Baker’s teaching that its routing table includes “an identifier for the intended end recipient” in some embodiments just because in other embodiments, it doesn’t. *See Mouttet*, 686 at 1332–33.

Second, Baker discloses comparing source and destination addresses to determine whether to retransmit a packet:

Since packets intended for more than one destination may arrive at a node on the same incoming channel . . . destination information such as a *destination MAC address* may be included in the connection table *so that an incoming channel and destination determine an outgoing channel for retransmission of a packet.* In embodiments the condition is

that the routing tables must hold *an identifier* that uniquely identifies the (bi-directional) path through the network. This may . . . be *a paired source-destination MAC address* . . .

Ex. 1004 ¶ 76 (emphasis added); Pet. 46 (citing same); Reply 4 (citing same). In other words, Baker's table includes a destination MAC address so that an incoming packet's destination address determines on which outgoing channel the packet should be relayed. *See* Ex. 1003 ¶¶ 310–317. Patent Owner concedes that in Baker, “a comparison occurs between a MAC address in the packet and a destination address in the routing table.” Sur-reply 4. But Patent Owner would have us believe that even though Baker compares two addresses, Baker never determines a *match* between those addresses. *Id.*; PO Resp. 10. This argument stretches credulity, as without the possibility of a match, there would be no purpose in Baker performing a comparison. It is plain to us that one of ordinary skill in the art would have understood that Baker's system determines whether the incoming packet's destination address matches a destination address in the table, and on that basis, determines whether to relay the packet. *See* Ex. 1004 ¶ 76; Ex. 1003 ¶¶ 310–317.

Patent Owner's contention that the determination to relay a packet in Baker is not based on any match does not withstand scrutiny. *See* Sur-reply 4. Baker teaches that “a destination MAC address may be included in the connection table so that an incoming channel and *destination determine an outgoing channel for retransmission* of a packet.” Ex. 1004 ¶ 76 (emphasis added). But as we noted above, Patent Owner concedes that “a comparison occurs between a MAC address in the packet and a destination address in the routing table.” Sur-reply 4. And the preceding passage explains that this comparison “determine[s] an outgoing channel for retransmission of a

packet.” Ex. 1004 ¶ 76. In other words, the result of this comparison (a match) determines an address where to retransmit (i.e., relay) the packet. See Ex. 1003 ¶¶ 310–317.

d. Summary as to Claim 1

Based on the entire record before us, we determine that Petitioner has shown by a preponderance of the evidence that claim 1 would have been obvious over Baker alone and over the combination of Baker and Bruckert.

4. Independent Claims 9 and 15

The parties argue claims 9 and 15 together with claim 1. See, e.g., Pet. 49–52; PO Resp. 8–9. For the reasons discussed above, we determine that Petitioner has shown by a preponderance of the evidence that claims 9 and 15 would have been obvious over Baker alone and over the combination of Baker and Bruckert.

5. Dependent Claims 5, 8, and 14

Petitioner contends that dependent claims 5, 8, and 14 are unpatentable as obvious over Baker alone (for claim 5) or over the combination of Baker and Bruckert (for claims 5, 8, and 14). Pet. 47–51 (arguing claim 5 over Baker and arguing claims 8 and 14 are taught by “Baker and Bruckert together”). Petitioner provides a detailed analysis explaining where Baker or the combination of Baker and Bruckert discloses the limitations in dependent claims 5, 8, and 14. *Id.* Patent Owner does not offer separate arguments for these claims or contest Petitioner’s analysis. We determine that Petitioner has shown by a preponderance of the evidence that claims 5, 8, and 14 would have been unpatentable as obvious over Baker alone (for claim 5) and over the combination of Baker and Bruckert (for claims 5, 8, and 14).

E. Asserted Obviousness over Baker, Bruckert, and McMillin

Petitioner contends that claims 2–4¹², 7, 10–12, 16, 18, and 20 would have been obvious over the combination of Baker, Bruckert, and McMillin. Pet. 52–58.

Petitioner provides a detailed analysis explaining where the combination of Baker, Bruckert, and McMillin discloses the limitations in dependent claims 2–4, 7, 10–12, 16, 18, and 20. *Id.* Petitioner supports its arguments with specific citations to Baker and McMillin¹³ and Dr. Wicker’s declaration. *Id.* (citing, e.g., Ex. 1018, 2, 25–34, 16:53–60; Ex. 1004 ¶¶ 41, 60, 62, 67; Ex. 1003 ¶¶ 350–382). Patent Owner does not dispute that the combination discloses all the elements of these dependent claims. Petitioner persuades us that the combination of Baker, Bruckert, and McMillin discloses all the limitations of dependent claims 2–4, 7, 10–12, 16, 18, and 20.

Petitioner also supplies a rationale to combine these references. Petitioner contends that “[a] POSITA would have been motivated to apply the teachings of McMillin to Baker/Bruckert to arrive at the subject matter of claims 2-4, 7, 10-12, 16, 18 and 20 as of the ’586 patent’s filing.” *Id.* at 56. First, Petitioner notes that McMillin identifies the problem of message collisions when two devices transmit simultaneously. *Id.* at 57 (citing Ex. 1018, 16:45–49). Next, Petitioner asserts that “McMillin’s ‘collision

¹² Although the Petition’s heading to Ground 2 references claim 5, Petitioner presents no arguments for claim 5 under this Ground. Pet. 52–56; 7 (summarizing Grounds and not including claim 5 in Ground 2).

¹³ Petitioner does not apply Bruckert directly to these dependent claims, only to the underlying independent claims. *See* Pet. 52–58.

avoidance’ techniques address this problem.” *Id.*¹⁴ Baker is directed to the same type of network as McMillin, Petitioner alleges. *Id.* Thus, Petitioner contends, “a POSITA would have understood that Baker’s system is not only subject to the same ‘collision’ problem identified by McMillin, but could be improved in the same way as McMillin itself.” *Id.* (citing Ex. 1003 ¶¶ 383–390). Finally, Petitioner identifies the following benefits of the combination—reducing the risk of message collision, garbling, and reduction, as well as minimizing wireless congestion and traffic. *Id.* (citing Ex. 1003 ¶¶ 391–92). Petitioner also asserts that there would have been a reasonable expectation of success because Baker and McMillin relate to similar networks and because “McMillin’s collision avoidance techniques are specifically designed to be used with a network like that taught by Baker.” *Id.* at 57–58 (citing, e.g., Ex. 1003 ¶¶ 393–95).

Patent Owner argues that Petitioner’s proposed combination is “facially deficient” because “the Petition fails to articulate a motivation to combine.” PO Resp. 17. Patent Owner charges the Petition with supplying an “omnibus” motivation to combine section spanning “four generalist paragraphs that do not reference a single claim feature.” *Id.* at 17–18. In Patent Owner’s view, “Petitioner’s generalized arguments about the similarities between the references, divorced from any specific claim limitation, are woefully deficient.” *Id.* at 18. Patent Owner also believes that Petitioner’s allegation that “McMillin’s collision avoidance techniques **could be** successfully applied to Baker” fails as a matter of law because Petitioner used the word “could” instead of “would” in some parts of its

¹⁴ For clarity, we standardize Petitioner’s spelling of “McMillin” throughout without bracketing.

argument. *Id.* at 19 (citing *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015)).

In Reply, Petitioner contends that the claims at issue in this ground “are thematically similar” and relate to avoiding network collisions, congestion, and interference, which “is exactly what McMillin teaches.” Reply 9. Petitioner charges Patent Owner with doing “little more than discuss[ing] the length of the motivation to combine section.” *Id.* at 10. But in Petitioner’s view, “[t]he amount of explanation needed to” show a motivation to combine “necessarily depends on context. A brief explanation may do all that is needed if . . . the technology is simple and familiar and the prior art is clear.” *Id.* (citing *Personal Web Tech., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017)). In Petitioner’s view, that is the case here. *Id.*

In the Sur-reply, Patent Owner asserts that Petitioner’s approach merely points to references that “are within the same field and are directed to solving the same problem,” which Patent Owner views as improper. Sur-reply 7. Patent Owner emphasizes that Petitioner provided no explanation for “why a POSITA would have found it obvious to combine **the particular claim limitations** in each of the dependent claims.” *Id.* Patent Owner also views Petitioner as misapplying *Personal Web*, which Patent Owner asserts applies to Board decisions, not Petitioner arguments. *Id.* at 7–8.

We agree with Petitioner that one of ordinary skill in the art would have combined these references to result in the subject matter of these dependent claims. During the oral hearing, Patent Owner conceded that the subject matter of some of these dependent claims generally relates to collision avoidance. Tr. 55:19–20 (“So some of the dependent claims relate

generally to collision avoidance.”). And Petitioner explicitly relies on McMillin’s disclosure of “collision avoidance techniques” to mitigate the problems with Baker’s network. Pet. 57. Patent Owner points us to no requirement that Petitioner must quote each claim limitation when discussing a rationale to combine; nor do we know of any.

Patent Owner’s argument effectively challenges the length of Petitioner’s argument rather than its substance. And we see no problems with the substance of Petitioner’s argument. In fact, we agree with Petitioner and Dr. Wicker that the close similarity between Baker and McMillin, along with the advantages in combining these references that Petitioner enumerates, persuasively shows that one of ordinary skill in the art would have combined these references to produce the recited claims. *See* Pet. 57; Ex. 1003 ¶¶ 383–90.

It is also not the case that Petitioner argues that the references merely “could” have been combined; rather, Petitioner asserts that “[a] POSITA *would* have been motivated to apply the teachings of McMillin to Baker/Bruckert to arrive at the subject matter of claims 2-4, 7, 10-12, 16, 18 and 20 as of the ’586 patent’s filing.” Pet. 56 (emphasis added); *see also id.* at 57 (“a POSITA would have understood”; “the risk of message collision, garbling, and corruption would be reduced”; “[a] POSITA would also have had a more than reasonable expectation of success”); *see also Belden*, 805 F.3d at 1073 (“[O]bviousness concerns whether a skilled artisan not only could have made but *would* have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention.” (emphasis added)).

For the reasons discussed above, we determine that Petitioner has shown by a preponderance of the evidence that dependent claims 2–4, 7, 10–12, 16, 18, and 20 would have been obvious over the combination of Baker, Bruckert, and McMillin.

F. Asserted Obviousness over Marman alone or Marman and Shoemake

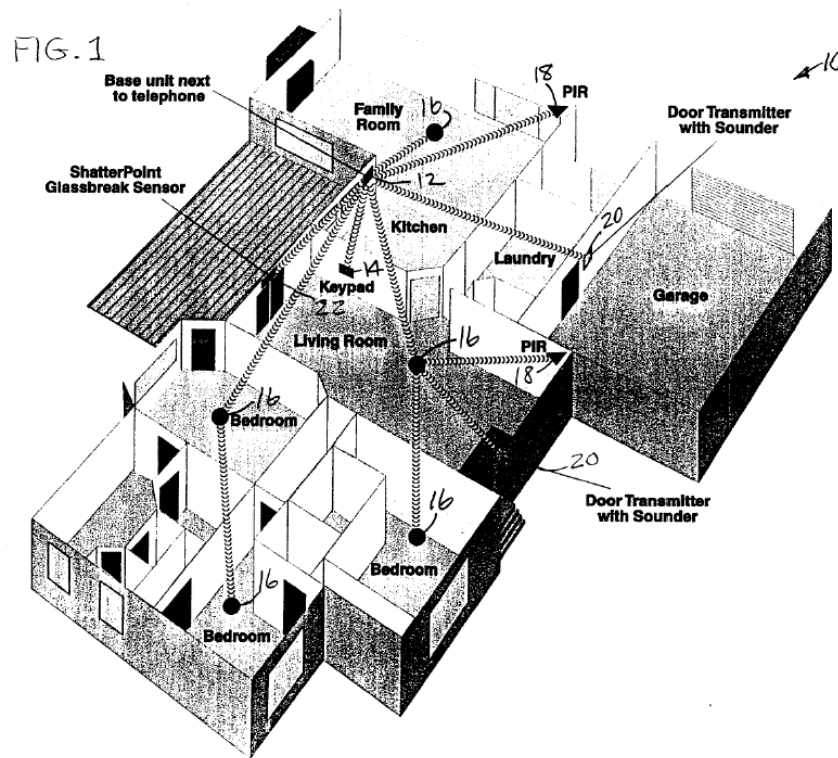
Petitioner contends that claims 1–5, 7–12, 14–16, 18, and 20 would have been obvious over Marman alone or over the combination of Marman and Shoemake. Pet. 58–73.

Because the obviousness ground over the combination of Marman and Shoemake is dispositive of claims 1, 2, 4, 5, 7–12, 14–16, 18, and 20,¹⁵ we do not reach Petitioner’s ground over Marman alone. *See Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. Apr. 30, 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

1. Overview of Marman

Marman describes a wireless residential fire and security alarm system. Ex. 1006, 1:13–14. The system includes two-way transceivers in smoke detectors, other sensors, and base stations. *Id.* at 3:15–16. Figure 1 depicts an example of this system:

¹⁵ We find below that Petitioner has not established that Marman alone or the combination of Marman and Shoemake would have rendered claim 3 obvious. But Petitioner persuasively applies the combination of Baker, Bruckert, and McMillin to claim 3, as discussed above. *See* Pet. 53.



Id. at 12:10–12. The system includes smoke detectors 16, other sensors, and base station 12. *Id.* at 12:11–13. The system routes messages by relaying messages from a transmitting device, through at least one intervening device, to a receiving device. *Id.* at 43:15–18. The system performs this relaying by using routing tables in each sensor. *Id.* at 44:11–13.

Communications in Marman’s system are packet-based, which includes packet routing and packet error control. *Id.* at 37:28–38:10, 40:2–7. Packets include a start synch word, data message, and end sync word. *Id.* at 40:4–5, 40:20–21. Both a source address and destination address are also included. *Id.* at 44:15–17.

2. Overview of Shoemake

Shoemake describes wireless transmission of data packets in an environment containing possible interfering communications. Ex. 1010 ¶ 3. Shoemake describes existing packet-based standards. *Id.* ¶ 5. According to

one standard, IEEE 802.11b, each message packet typically includes a preamble and header portion that includes identifying information, as well as a payload portion and a checksum. *Id.*

3. *Independent Claim 1*

a. *Undisputed limitations*

Petitioner contends that the combination of Marman and Shoemake discloses the preamble 1-p and all of the limitations 1-1 through 1-6 of claim 1. Pet. 58–66. Patent Owner does not dispute these contentions, instead solely disputing Petitioner’s rationale to combine, which we address in the next section. *See* PO Resp. 29–33.¹⁶

Petitioner supports its arguments with specific citations to Marman and Shoemake and Dr. Wicker’s declaration. Pet. 58–66 (citing, e.g., Ex. 1006, *passim*; Ex. 1003 ¶¶ 400–466). We agree with Petitioner that the combination of Marman and Shoemake discloses the preamble 1-p and limitations 1-1 through 1-6. We need not determine whether the preamble is limiting because even if it were, we determine that Petitioner has shown that the combination of Marman and Shoemake discloses it.

b. *Motivation to Combine Marman and Shoemake*

Petitioner argues that one of ordinary skill in the art would have combined Marman and Shoemake because Shoemake’s packet was

¹⁶ Patent Owner disputes that Marman *alone* discloses all the claim limitations, PO Resp. 20–29, but does not dispute that Shoemake discloses those limitations, *id.* at 29–33. Specifically, Patent Owner disputes that Marman discloses the claimed “communication packet including a preamble portion, an identification code portion, a data payload portion, and an integrity portion. *Id.* at 20–29. Petitioner also relies on Shoemake for this limitation. Pet. 62–64; Reply 21.

“standard” and “typical” when the ’586 patent was filed. Pet. 63–64 (citing Ex. 1001 ¶ 5; Ex. 1003 ¶ 453). Petitioner further supports the combination as follows:

A POSITA would also have every reason to believe that this standard packet could be successfully used with Marman. Again, Marman’s system already engages in packet-based communications with packets that include a preamble, address, and data. They also facilitate the ability to engage in error correction. The standard, typical 802.11 wireless packet exemplified by Shoemake has all these same components and properties.

Id. at 64 (citing Ex. 1003 ¶¶ 454–456, 46–68.).

Patent Owner raises two arguments: “a POSITA would not have been motivated to select the IEEE 802.11(b) packet for use in Marman because (1) more suitable protocols existed for use in systems like Marman’s, and (2) Marman teaches away from adding complexity to its packets.” PO Resp. 30 (citing Ex. 2006 ¶¶ 77–78).

Patent Owner does not elaborate on its first argument. *Id.* As for its second argument, Patent Owner asserts that “Marman’s system is concerned with conserving battery power and reducing costs.” *Id.* at 31 (citing Ex. 1006, 3:13–14; Ex. 2006 ¶ 79). Patent Owner then contends that Marman conserves battery power by “minimizing the size of [its] messages.” *Id.* at 31–32 (citing, e.g., Ex. 1006, 14:8–19; Ex. 2006 ¶ 81). Specifically, Patent Owner asserts that Marman omits certain message parts, such as some message preambles, to conserve battery power. *Id.* at 32 (citing Ex. 2006 ¶ 81; Ex. 1006, 32:22–23 (“Shorter addresses make for shorter, more rapid transmission times, which reduces battery consumption.”)). And Patent Owner contends that “Petitioner’s suggestion to replace Marman’s short, pithy messages with the longer packet structure of Shoemake would

introduce the very complexity Marman teaches away from using.” *Id.* at 32 (citing Ex. 2006 ¶ 82). Thus, Patent Owner concludes, “[a] POSITA would be discouraged by Marman’s teachings from modifying it to include the complex IEEE 802.11 packet in Shoemake, increasing message complexity and battery requirements.” *Id.* at 33 (citing Ex. 2006 ¶ 82).

Petitioner responds that there is no teaching away here because, among other reasons, Marman already teaches the use of packet communications. Reply 22. Petitioner views Marman as teaching enhancements for battery conservation, but views them as merely “possible benefits provided by certain embodiments, not required features that must be present in all cases.” *Id.* at 23 (citing Ex. 1006, 4:10). Acknowledging that Marman describes message lengths causing battery life issues in “conventional alarm systems,” Petitioner asserts that this teaching “relates only to whatever message type ‘conventional alarm systems’ use,” not standard IEEE 802 packets. *Id.* (citing Ex. 1006, 14:1–19). And Petitioner faults Patent Owner’s view that “the use of packets is somehow inconsistent with Marman’s desire for ‘short, pithy messages’” because “the process of packetizing data entails chopping up a larger data message into smaller pieces for transmission.” *Id.* at 24 (citing Ex. 1003 ¶¶ 47–50). In Petitioner’s view, “a POSITA would have understood that Marman has already achieved its goal of achieving ‘short, pithy messages’ by using packets in the first place.” *Id.* (citing Ex. 1003 ¶¶ 47–48).¹⁷

¹⁷ Petitioner also raises other arguments that we find unnecessary to reach here, including that Marman already employs the IEEE 802 layered network protocol. Reply 23.

In the Sur-reply, Patent Owner reemphasizes that although Marman describes packets, it teaches away from other types of packets. Sur-reply 16. Patent Owner relies on the testimony of Dr. Madisetti that “Marman teaches the use of short, pithy messages to conserve battery power, often breaking up information into smaller pieces,” expressly discouraging a “longer, standardized form” of packets. *Id.* at 18 (citing Ex. 2006 ¶ 81; Ex. 1006, 14:8–19).¹⁸ The Sur-reply also raises a new argument—that “[t]he only ‘reason’ [to combine] Petitioner provided is that a POSITA would have considered it obvious to use such a packet because it was ‘standard’ and ‘typical’ when the ’586 patent was filed.” Sur-reply 15–16 (citing Pet. 63–64).

Turning to our analysis, we agree with Petitioner that one of ordinary skill in the art would have combined Shoemake with Marman. We find persuasive Dr. Wicker’s testimony that Shoemake’s packets were “routine, typically used, and even standard required” when the ’586 patent was filed. *See* Ex. 1003 ¶ 453 (citing Ex. 1010 ¶ 5). We further agree with Dr. Wicker that disclosing a packet structure as part of this standard “would [have] provide[d] a strong motivation for the use of such a packet” in another packet-based system like Marman’s. *See id.*¹⁹ We thus agree with Petitioner’s reasoning that one of ordinary skill in the art would have combined Shoemake’s packet with Marman’s packet. Pet. 63–64.

¹⁸ Because we find it unnecessary to address Petitioner’s argument that Marman already employs the IEEE 802 layered network protocol (*see supra*, nn.17–18), we also need not address Patent Owner’s response to this argument. *See* Sur-reply, 17.

¹⁹ We also note that Patent Owner elected not to cross-examine Dr. Wicker.

Patent Owner’s arguments do not undermine Petitioner’s persuasive showing. Its first argument, that more suitable protocols existed for use in systems like Marman’s, is simply conclusory and unsupported. *See* PO Resp. 30 (citing Ex. 2006 ¶¶ 77–78). Patent Owner does not explain this argument at all, and we accord it no weight. *See id.*; Reply 22 (“Patent Owner’s expert Dr. Madisetti names some such other protocols . . . , but provides no explanation as to why they are ‘more suitable.’”).

Patent Owner’s second argument, that Marman teaches away from adding complexity to its packets due to battery life issues, is also unavailing. Petitioner raises two points in response to this argument that we find persuasive. Reply 22–23. First, Petitioner correctly explains that Marman’s battery conservation communications protocols are optional “enhancements,” not required features. *Id.* at 23; Ex. 1006, 4:10 (“Further enhancements include battery conserving communications protocols”). Marman’s communications protocol embodiments therefore disclose a general preference for an alternative, which is insufficient to teach away. *See DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009).

Marman also does not criticize, discredit, or otherwise disparage systems with larger packets than its own. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) (“The prior art’s mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed”). Although Marman sends some messages “without the use of preambles” because “[t]he sensor address information consumes most of the message length,” Marman explains that “a series of

messages *can* be exchanged without the use of preambles,” not that messages “must” be exchanged without preambles. *Id.* at 14:4–5, 16–17. Stating a mere preference that the system “can” exchange messages without preambles hardly criticizes, discredits, or disparages systems that do use preambles.

The second point that Petitioner persuasively explains is that Marman attempts to improve battery life over “conventional alarm systems,” and this teaching “relates only to whatever message type ‘conventional alarm systems’ use,” not standard IEEE 802 packets as in Shoemake. Reply 23 (citing Ex. 1006, 14:1–19). Marman explains that “conventional systems . . . are poor at detecting a typical message.” Ex. 1006, 14:2–7. Marman contrasts those systems with its approach, in which “a preamble to the message can be transmitted,” and then “a series of messages can be exchanged without preambles.” *Id.* at 14:10–11, 15–16. Patent Owner’s expert asserts,

Petitioner’s suggestion to replace Marman’s short, pithy messages with the longer packet structure of Shoemake would introduce the very complexity Marman teaches away from using and is a modification that a POSITA would not have made. It would disturb Marman’s goal of reducing battery consumption by introducing the very communication complexity Marman specifically sought out to reduce.

Ex. 2006 ¶ 82. But Marman at most discusses the pitfalls of using conventional alarm system packets, not the pitfalls of using Shoemake’s IEEE 802 packets. *See* Ex. 1006, 14:1–19. Dr. Madisetti does not compare Shoemake’s packets with Marman’s packets, nor does he provide any details on how Shoemake’s packets would impact battery consumption in Marman. *See id.*; Tr. 67:4–20 (Patent Owner conceding at the oral hearing that Dr.

Madisetti did not perform any numerical or quantitative analysis to compare the lengths of the Shoemake packet to Marman's packet or to analyze any increase in battery consumption from incorporating Shoemake's packets into Marman.). But "[e]xpert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight." 37 C.F.R. § 42.65(a). Thus, there is a dearth of evidence in the record on what actual effect on battery life Shoemake's packets would have had when combined with Marman, if any. So Patent Owner's argument that the combination would have negatively impacted Marman's battery life is wholly speculative and unsupported by reliable expert testimony.

Regardless, "[a] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine." *Allied Erecting v. Genesis Attachments*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (citation omitted). Thus, even if the use of Shoemake's packets impacted Marman's battery life to some extent, this disadvantage would not necessarily obviate a motivation to combine. We determine that the advantages of using standard IEEE 802.11b packets would outweigh any potential (and on this record, speculative) disadvantages of combining with Marman. One of ordinary skill in the art would not have found any speculative battery life reduction to outweigh the advantages of using Shoemake's standard IEEE 802.11 wireless packets.

We also do not view the combination as being "uniquely challenging or difficult for one of ordinary skill in the art" or "represent[ing] an unobvious step over the prior art." *Leapfrog Enters. Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–19 (2007)). Petitioner's arguments are reasonable

because the skilled artisan would “be able to fit the teachings of [these] patents together like pieces of a puzzle” because the skilled artisan is “a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 420–21. The claimed subject matter exemplifies the principle that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at 416.

Finally, for the first time in its Sur-reply, Patent Owner asserts that “[t]he only ‘reason’ Petitioner provided is that a POSITA would have considered it obvious to use such a packet because it was ‘standard’ and ‘typical’ when the ’586 patent was filed.” Sur-reply 15–16 (citing Pet. 63–64). Although Patent Owner raised this argument in its Preliminary Response, it did not raise it again in its Patent Owner Response. *See* Prelim. Resp. 33. We cautioned Patent Owner in the Scheduling Order that “any arguments not raised in the response may be deemed waived.” Paper 8, 8. Thus, we dismiss this argument as untimely. *See* 37 C.F.R. § 42.23(b) (“A sur-reply may only respond to arguments raised in the corresponding reply . . .”).

c. Summary as to Claim 1

Based on the entire record before us, we determine that Petitioner has shown by a preponderance of the evidence that claim 1 would have been obvious over the combination of Marman and Shoemake.

4. Independent Claims 9 and 15

Petitioner asserts that independent claims 9 and 15 are similar to claim 1. Pet. 69–72. Petitioner’s detailed analysis explaining where the combination of Marman and Shoemake teaches the limitations in these claims is similar to the analysis discussed above with respect to claim 1. *Id.*

Patent Owner relies on the same arguments for claims 9 and 15 as it does for claim 1. *See* PO Resp. 20–33. For the reasons discussed above, we determine that Petitioner has shown by a preponderance of the evidence that claims 9 and 15 would have been obvious over the combination of Marman and Shoemake.

5. Dependent Claims 2–5, 7, 8, 10–12, 14, 16, 18, and 20

Petitioner contends that dependent claims 2–5, 7, 8, 10–12, 14, 16, 18, and 20 would have been obvious over the combination of Marman and Shoemake. Pet. 66–73. Petitioner provides a detailed analysis explaining where the combination of Marman and Shoemake discloses the limitations in dependent claims 2–5, 7, 8, 10–12, 14, 16, 18, and 20. *Id.* Except for claims 3 and 5, Patent Owner does not offer separate arguments for these claims or contest Petitioner’s analysis. *See* PO Resp. 33–35. Apart from claim 3, we agree that Petitioner that has shown by a preponderance of the evidence that claims 2, 4, 5, 7, 8, 10–12, 14, 16, 18, and 20 would have been obvious over the combination of Marman and Shoemake.

a. Claim 3

Claim 3 depends indirectly from claim 1 and recites, “the controller configured to: prior to the transmission of the communication packet, determine a delay value; and wait the determined delay value before the transmission of the communication packet.” Ex. 1001, 17:54–59. Petitioner contends that Marman discloses this limitation because “each sensor” in Marman’s system “delays transmitting a message until its receiver has sampled the airwaves to ensure there is no interference.” Pet. 66–67 (citing Ex. 1006, 20:43-46; Ex. 1003, ¶¶ 471-473).

Patent Owner contends that the single sentence of Marman relied on by Petitioner does not disclose that Marman's devices "determine a delay value" or wait for that specific value before transmitting a packet. PO Resp. 33–34 (citing, e.g., Ex. 2006 ¶ 83). Instead, Patent Owner argues, "it merely teaches that transmission is delayed while an interference check occurs." *Id.* (citing Ex. 1006, 26:25–27; Ex. 2006 ¶ 83). And Patent Owner contends that Petitioner supplied no reason why claim 3 would have been rendered obvious. *Id.*

Petitioner responds that the determined delay value "is the total amount of time it takes for the interference issue to resolve." Reply 24–25. In Petitioner's view, "[n]othing about this claim requires the use of a fixed amount of delay that is the same in all circumstances." *Id.* at 25. "Instead," Petitioner argues, "the claim is open to a delay that is determined based on the circumstances." *Id.* In the Sur-reply, Patent Owner contends that "Petitioner overlooks that the claim requires that the controller first 'determine[s] a delay value' and then 'wait[s] the determined delay value.'" Sur-reply 19. And Patent Owner contends, "[i]f Marman's sensor is checking for resolution of the interference issue before transmitting, as Petitioner alleges, it is not waiting a 'determined delay value'; it is instead waiting some not-yet-determined amount of time." *Id.*

We agree with Patent Owner. Petitioner stretches the disclosure of Marman too thinly. Marman's system simply "delays transmitting a message until its receiver has sampled the airwaves to ensure there is no interference." Ex. 1006, 26:25–27. It does not "determine a delay value" and "wait the determined delay value" as claimed. Petitioner reads too much into the word "delays" in Marman, as if that encompasses both determining

a delay value and delaying itself. It does not. That is an incorrect interpretation of the claim because it reads the “determine a delay value” limitation out of the claim.

Accordingly, we determine that Petitioner has not shown by a preponderance of the evidence that claim 3 would have been obvious over Marman alone or over the combination of Marman and Shoemake.

b. Claim 5

Claim 5 depends from claim 1 and recites, “wherein if the identification code portion of the received communication packet does not match an entry in the table of identifiers stored in the audio-enabled wireless device, the controller is configured to not relay the communication packet.” Ex. 1001, 17:62–67. Petitioner contends that “Marman explains that a sensor will relay a received message only if a ‘match is found’ for the message’s ‘destination address’ in the sensor’s ‘routing table.’” Pet. 67 (citing Ex. 1006, 44:19–22). Petitioner then contends that “[i]t follows that the message will not be relayed by the sensor if there is no matching address.” *Id.* (citing Ex. 1003 ¶¶ 477–80).

Patent Owner contends that “[a]t best, Marman is silent with respect to what happens when a match is not found.” PO Resp. 35 (citing Ex. 2006 ¶ 84). Patent Owner further contends, “[o]ne possibility in a scenario where a match is not found is that the message is relayed **with modification**, possibly to indicate that no match was found by the forwarding device and to see if another router in the system can find a match.” *Id.* (citing Ex. 2006 ¶ 85).

Petitioner responds that Patent Owner’s argument “makes no sense,” as Marman “determine[s] whether to relay or *discard* a message.” Reply

25–26 (citing Ex. 1006, 44:17–18). Thus, Petitioner contends, Marman is not “silent with respect to what happens when a match is not found,” as Patent Owner argues. *Id.* at 26 (citing PO Resp. 26). Instead, Petitioner contends, “Marman states that such a message is ‘discard[ed].’” *Id.* Patent Owner’s Sur-reply does not respond to this argument.

We agree with Petitioner that Marman’s teaching of discarding packets discloses the claimed limitation. Marman’s determination to “discard a message” is equivalent to “not relay[ing] the communication packet” as claimed. *See* Ex. 1006, 44:17–18; Ex. 1003 ¶¶ 477–80. Thus, Petitioner has shown by a preponderance of the evidence that claim 5 would have been obvious over the combination of Marman and Shoemake.

IV. CONCLUSION²⁰

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 5, 8–9, 14–15	103(a)	Baker	1, 5, 8–9, 14–15	
1, 5, 8–9, 14–15	103(a)	Baker, Bruckert	1, 5, 8–9, 14–15	
2–4, 7, 10–12, 16, 18, 20	103(a)	Baker, Bruckert, McMillin	2–4, 7, 10–12, 16, 18, 20	
1–5, 7–12, 14–16, 18, 20	103(a)	Marman ²¹		
1–5, 7–12, 14–16, 18, 20	103(a)	Marman, Shoemake	1, 2, 4, 5, 7–12, 14–16, 18, 20	3
Overall Outcome			1–5, 7–12, 14–16, 18, 20	

²⁰ 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).

²¹ As discussed above, we do not reach this ground in light of our decision on the Marman and Shoemake ground.

V. ORDER

It is, therefore,

ORDERED that Petitioner has shown by a preponderance of the evidence that claims 1–5, 7–12, 14–16, 18, and 20 of the '586 patent are unpatentable; and

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

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