

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

EMERSON ELECTRIC CO.,
Petitioner,

v.

IPCO, LLC,
Patent Owner.

Case IPR2017-00213
Patent 8,625,496 B2

Before PHILLIP J. KAUFFMAN, CHRISTOPHER L. CRUMBLY, and
JASON W. MELVIN, *Administrative Patent Judges*.

MELVIN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Petitioner, Emerson Electric Co., filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 21–24, 37–39, and 45 (“the challenged claims”) of U.S. Patent No. 8,625,496 B2 (Ex. 1001, “the ’496 patent”). Patent Owner, IPCO, LLC, filed a Preliminary Response. Paper 8. On May 15, 2017, we instituted review of the challenged claims. Paper 13 (“Institution Decision” or “Inst.”).

Patent Owner filed a Response (Paper 19, “PO Resp.”) and Petitioner filed a Reply (Paper 27, “Pet. Reply”). We held a hearing on January 31, 2018, and a transcript of the hearing is included in the record. Paper 40 (“Tr.”).

This a final written decision as to the patentability of claims for which *inter partes* review was instituted. For the reasons discussed below, we determine that Petitioner has proven by a preponderance of the evidence that claims 21–24, 37–39, and 45 are unpatentable.

A. RELATED MATTERS

The parties identify the following pending judicial matters as relating to the ’496 patent: *SIPCO, LLC v. Emerson Electric Co.*, No. 1:16-cv-02690 (N.D. Ga.) (filed Oct. 16, 2015, in E.D. Tex. and transferred to N.D. Ga.); *SIPCO, LLC v. Streetline, Inc.*, No. 1:16-cv-830 (D. Del.). Pet. 3; see Paper 4, 1.

The parties identify the following related Board proceedings: IPR2013-00482 (U.S. Pat. No. 6,044,062); IPR2014-00147 and IPR2016-01602 (U.S. Pat. No. 6,249,516); IPR2015-01901 (U.S. Pat. No. 8,000,314); IPR2017-00007 and IPR2017-00008 (U.S. Pat. No. 8,233,471). Pet. 3; Paper 4, 2.

B. THE '496 PATENT

The '496 patent relates to a wireless network for transmitting digital data packets. Ex. 1001, 1:25–27. The '496 patent explains that prior wireless networks did not allow each client in the network to efficiently and effectively communicate with a multiplicity of other clients and servers in the network. *Id.* at 4:39–47. To improve on these prior wireless networks, the '496 patent describes a wireless network in which each client selects the path by which it transmits packets to a server. *Id.* at 5:24–26. The path can be either a direct path (1 hop) to the server or an indirect path (multi-hop) through other clients. *Id.* at 5:26–29. According to the '496 patent, the client searches for an improved path to the server and preferably chooses the best path, whether that is a direct path or an indirect path. *Id.* at 5:29–31, 5:43–46.

C. CHALLENGED CLAIMS

Challenged claims 21, 24, 37, and 45 are independent. Claims 21 and 37 (reproduced below) are illustrative of the claimed subject matter:

21. A wireless network system comprising:

- a first node including a first node controller and a first node radio modem, said first node controller implementing a first node process that includes controlling of said first node radio modem, said first node process including receiving and transmitting data packets via said first node radio modem;
- a plurality of second nodes each including a second node controller implementing a second node process that includes controlling a second node radio modem, said second node process including receiving and transmitting data packets via said second node radio modem, wherein said second node process of each of said second nodes includes initiating a radio

transmission path to said first node that is a link to said first node through at least one of the remainder of said plurality of second nodes,

wherein said first node process dynamically updates a second node link tree comprising second node link entries representing each of the plurality of second nodes and dynamically modifies the second node link tree so that the data packet transmission path to the first node is optimized.

Ex. 1001, 27:8–31.

37. A method for providing wireless network communication comprising:

implementing in a first node a first node process including receiving data packets via R.F. transmission and sending data packets via R.F. transmission;

implementing in each of a plurality of second nodes a second node process including sending and receiving data packet via R.F. transmission, maintaining a send/receive data buffer in digital memory, and selecting a transmission path to said first node that is one of a direct link to said first node and an indirect link to said first node through at least one of the remainder of said plurality of second nodes; and

maintaining a second node link tree having second node link entries representing each of the plurality of second nodes at the first node.

Ex. 1001, 30:45–60.

D. REVIEWED GROUNDS OF UNPATENTABILITY

Petitioner asserts, and this review includes, the following grounds of unpatentability, each based on 35 U.S.C. § 103(a):^{1, 2}

References	Challenged Claims
Burchfiel ³	21, 22, 24, 37, 38, 45
Burchfiel and Schwartz ⁴	21, 22, 24, 37, 38, 45
Burchfiel and Gitman ⁵	21, 22, 24, 37, 38, 45
Burchfiel, Schwartz, and Gitman	21, 22, 24, 37, 38, 45
Burchfiel and Kahn ^{6, 7}	23, 39

¹ The America Invents Act included revisions to, *inter alia*, 35 U.S.C. § 103 effective on March 16, 2013. Because the '496 patent issued from an application filed before March 16, 2013, the pre-AIA version of 35 U.S.C. § 103 applies.

² In our Institution Decision, we determined that we would proceed on only some of the grounds raised by Petitioner. Inst. 10–12, 23–24. We later expanded this review to include all of the grounds presented in the Petition. Paper 41.

³ Burchfiel, J., *et al.*, Functions and Structure of a Packet Radio Station, AFIPS National Computer Conference (1975) (Cornell University) (Ex. 1004).

⁴ Schwartz, M., Telecommunication Networks: Protocols, Modeling and Analysis, Addison-Wesley Publishing Co. (1988) (Ex. 1006).

⁵ Gitman, I., *et al.*, Routing in Packet-Switching Broadcast radio Networks, IEEE Transactions on Communications (1976) (Ex. 1005).

⁶ Kahn, R., The Organization of Computer Resources into a Packet Radio Network, National Computer Conference (1975) (Ex. 1007).

⁷ Petitioner includes “Admitted Prior Art (‘APA’)” in several asserted unpatentability grounds. *E.g.*, Pet. 4–6; *see also id.* at 4 n.2 (noting that prior Board panels have relied on APA as a “patent/printed publication” and citing the underlying publications referenced in the '496 patent, Exhibits 1010 and 1011). As explained below, we consider the APA as

References	Challenged Claims
Burchfiel, Schwartz, and Kahn ⁷⁵	23, 39
Burchfiel, Gitman, and Kahn ⁷⁵	23, 39
Burchfiel, Schwartz, Gitman, and Kahn ⁷⁵	23, 39
Burchfiel, Schwartz, Kahn ⁷⁵ , and McQuillan ⁸	23, 39
Burchfiel, Schwartz, Gitman, Kahn ⁷⁵ , and McQuillan	23, 39

Petitioner also relies on several declarations from James T. Geier (Exs. 1003, 1012, 1014, 1032).

E. LEGAL PRINCIPLES

1. Burden of proof

In an *inter partes* review, the petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to the patent owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must support its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). Accordingly, all of our findings and conclusions are based on a preponderance of the evidence.

2. Claim construction

The '496 patent expired on December 6, 2016. *See* Pet. 8; PO Resp. 8. The Board interprets expired claims using a district-court-type standard,

background knowledge and therefore do not include it in the titles of the grounds.

⁸ McQuillan, J., The New Routing Algorithm for the ARPANET, IEEE Transactions on Communications (1980) (Ex. 1008).

similar to that described by the Federal Circuit in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). *See In re Rambus*, 694 F.3d 42, 46 (Fed. Cir. 2012); *cf.* 37 C.F.R. § 42.100(b) (applying the broadest-reasonable construction only to unexpired claims). Under that standard, we construe claims as understood by one of ordinary skill in the art reading the patent, taking into account the ordinary-and-customary meaning of claim terms, “the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.” *See Phillips*, 415 F.3d at 1314 (quoting *Innova /Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (2004)).

3. Obviousness

An invention is not patentable “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.” 35 U.S.C. § 103(a). 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) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

When evaluating a combination of teachings, we must also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR Int’l Co. v. Teleflex Inc.*,

550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441, F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of elements would have produced a predictable result weighs in the ultimate determination of obviousness. *KSR*, 550 U.S. at 416–17. We analyze the grounds based on obviousness in accordance with the above-stated principles.

II. DISCUSSION

A. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner proposes that a person of ordinary skill in the art as of December 6, 1996, “would have a minimum of a bachelor’s degree in Electrical Engineering and 2–3 years’ experience in the development and design, or technical marketing, of radio communications and computer network systems, or the equivalent (e.g., education substituting for experience or vice-versa).” Pet. 10 (citing Ex. 1003 ¶¶ 9–10). Patent Owner does not challenge this proposal.⁹

Petitioner’s definition appears consistent with the art at issue in this proceeding (*see Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)), and we adopt it.

B. CLAIM CONSTRUCTION

We determine that only the following terms require express construction to resolve the issues in this proceeding. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those

⁹ Patent Owner’s declarant, Dr. Kevin C. Almeroth, applies a level of ordinary skill in the art very similar to Petitioner’s and states that his opinions would not change under Petitioner’s stated level of ordinary skill. Ex. 2002 ¶¶ 70–77.

terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

1. “link” or “transmission path”

The parties each propose constructions for “transmission path” or “link” as used in each of the independent claims. *See* Pet. 9–10; PO Resp. 10–14.

The parties agree that a link or transmission path must “include an entire path from a second node to the first node in a wireless network.” PO Resp. 11–12; *accord* Pet. 9 (“an entire path to the first node”). Petitioner proposes that a link or transmission path must also include “the identification of each of the hops to be traversed by the data message packet en route to the first node.” Pet. 9. Petitioner concedes, however, that, “construction of this term does not affect the outcome of these proceedings.” Reply 2.

We conclude that Patent Owner’s construction offers a clearer expression of the claim term and adequately defines the term for purposes of this proceedings. Accordingly, we adopt Patent Owner’s construction of “link” or “transmission path” as “a description of an entire path from the second node to the first node.” *See* PO Resp. 12.

2. “second node link tree”

Patent Owner proposes that we construe “second node link tree” as “a data structure containing a representation of a plurality of transmission paths from a second node to a first node through other second nodes in the form of a graph with no cycles.” PO Resp. 14–16. Petitioner contends we need not

construe the term but that, if we do, it should mean “a data structure for storing radio transmission paths/links where each second node has exactly one path/link to the first node.” Reply 4–7.

Petitioner contests a number of aspects of Patent Owner’s construction. Tr. 4:17–6:22; Reply 5–7. First, Petitioner challenges whether a link tree must include a plurality of paths between two nodes. Reply 5–6. We agree with Petitioner that the claimed link tree need not include more than one path between each second node and the first node. For example, claim 21 states that the tree contains “entries for each of the plurality of second nodes . . . so that the data packet transmission path to the first node is optimized.” Ex. 1001, 27:26–31. That phrasing requires only a single path for each second node.

We further agree with Petitioner that Patent Owner’s proposed construction would improperly exclude direct links to the first node, by requiring a path be “through other second nodes.” The claims recite that a link may be directly to the first node. See Reply 6 (citing Ex. 1001, 27:56–58 [claim 24], 30:53–57 [claim 30], 4:63–67.

Finally, Petitioner asserts that including “in the form of a graph with no cycles” in the construction would not further clarify the meaning of the term. Reply 7. We conclude that the meaning of the link tree is clearer when phrased as in Petitioner’s proposed construction, and that adopting Patent Owner’s construction would not appear to change the claim scope or affect a disputed issue of unpatentability.

Accordingly, we conclude that a “second node link tree” should be construed as “a data structure for storing radio transmission paths/links

where each second node has exactly one path/link to the first node.” See Ex. 1001, 9:41–54, Figs. 1a, 1b; Ex. 1037; Ex. 1040.

3. “selecting a link” or “selecting a transmission path”

Patent Owner argues that selecting a link or transmission path requires that the second node choose among alternative paths. PO Resp. 16–18. Petitioner asserts that no construction is required for the term but that the challenged claims are unpatentable under Patent Owner’s construction. Reply 7. Petitioner confirmed at the hearing that it agrees with Patent Owner’s construction. Tr. 10:11–19. The record adequately supports the parties’ agreed construction, and thus, we adopt Patent Owner’s construction.

C. OBVIOUSNESS OVER BURCHFIEL AND GITMAN

Petitioner asserts that the combined teachings of Burchfiel and Gitman would have rendered the subject matter of claims 21, 22, 24, 37, 38, and 45 obvious to one of ordinary skill in the art at the time of invention. Pet. 5, 10–50.

1. Burchfiel (Ex. 1004)

Burchfiel teaches a “packet radio network” (PRN) comprising a number of stations and repeaters to exchange data packets. Ex. 1004, 245.¹⁰ Burchfiel’s network relies on the stations to initialize the network and construct a connectivity matrix, which maintains information about which repeaters are in direct communication with a station. *Id.* at 247. The

¹⁰ We refer to the native page numbers rather than the exhibit number added to the lower right hand corner of each page.

connectivity matrix is used to determine routing parameters given to the repeaters. *Id.* Information about connections between the repeaters and a station is stored within a connection table at the station. *Id.* (“This [connection table] contains the status information described above for handling the connection protocol. As terminals come ‘on-line’ within the PRN, each terminal is also given a connection to its controlling station, and this information is added to the station’s connection table.”).

Burchfiel teaches that “[d]ynamic routing changes are performed locally within the PRN by permitting a repeater to specify an alternate address for the next hop after some number of unsuccessful attempts to forward the packet along its specified route.” *Id.* Burchfiel also teaches that “persistent alternative routing of packets signals” that a repeater or station has failed “and the station detecting it must reconfigure the PRN to route all traffic around the failed element.” *Id.* at 247–48.

2. Gitman (Ex. 1005)

Gitman is a paper addressing packet transportation and routing in multihop networks. Ex. 1005, 926.¹¹ In Gitman’s terms, the nodes of such a network may have basic functionality—“origination, destination, and relay functions”—called a “repeater” or may have additional functionality—“gateway, global control, global initialization, accounting, and directory functions”—called a “station.” *Id.* at 927. Gitman presents several strategies for routing packets in such networks, including “hierarchical routing algorithms.” *Id.* at 927–29. In the hierarchical routing algorithms, Gitman

¹¹ We refer to native page numbers rather than the exhibit number added to the lower right hand corner of each page.

teaches labeling each station and repeater, such that “[t]he complete path between the station and a repeater is defined by the label of the repeater.” *Id.* at 928. Gitman also teaches strategies for resolving blocking, including a “search” protocol used by a repeater:

A “search” protocol uses a search packet specifying the class of repeaters sought. A response by such a repeater contains the hierarchical label of the responding repeater. The searching repeater substitutes the label of the responding repeater into the original packet and transmits the packet.

Id. at 929.

3. Claim 37

Petitioner asserts that Burchfiel substantially teaches the limitations of the independent claims but relies on Gitman as teaching the claimed routing, in which a second node selects the transmission path for a packet. Patent Owner contests certain aspects of Petitioner’s assertions, and further asserts that objective evidence shows the subject matter of the independent claims would not have been obvious to a person of ordinary skill in the art.

We focus on claim 37. Petitioner asserts that claim is “representative” (Pet. 16 n.5) and Patent Owner addresses all independent claims collectively (PO Resp. 23–38).¹²

a. Evidence of unpatentability

Claim 37 recites “[a] method for providing wireless network communication.” Petitioner asserts that Burchfiel teaches the preamble.

¹² We note that our Scheduling Order cautions Patent Owner “that any arguments for patentability not raised in the [Patent Owner’s Response] will be deemed waived.” *See* Paper 14, 7; *see also* *See In re NuVasive, Inc.*, 842 F.3d 1376, 1380–81 (Fed. Cir. 2016).

Pet. 16 (citing Ex. 1004, 245, 246, Fig. 1; Ex. 1003 ¶¶ 75–78). Patent Owner does not contest Petitioner’s assertions in this regard. We need not decide whether the preamble limits the claims because we find Burchfiel discloses a method consistent with the preamble.

Claim 37 recites “implementing in a first node a first node process including receiving data packets via R.F. transmission and sending data packets via R.F. transmission.” Petitioner asserts that Burchfiel teaches this limitation by disclosing a station with software to send and receive packets via RF transmission. Pet. 17–20 (citing Ex. 1004, 245–47, 249, 250, Figs. 1, 2, 4, 5; Ex. 1003 ¶¶ 79–94). Patent Owner does not contest that Burchfield teaches this limitation. We agree with Petitioner’s assertions and find that Burchfiel teaches this limitation.

Claim 37 recites “implementing in each of a plurality of second nodes a second node process including sending and receiving data packet via R.F. transmission, maintaining a send/receive data buffer in digital memory, and selecting a transmission path to said first node that is one of a direct link to said first node and an indirect link to said first node through at least one of the remainder of said plurality of second nodes.” As discussed above, we construe this limitation as requiring that the selected path describes an entire path from the second node to the first node. *See supra* at 9. We also construe it as requiring that the second node choose among alternative descriptions of an entire path from the second node to the first node. *See supra* at 9–11, sections B.1, B.3.

Petitioner asserts that Burchfiel teaches second nodes as “terminals” or “repeaters.” Pet. 20–25 (citing Ex. 1004, 245–48, Figs. 1–3; Ex. 1003 ¶¶ 95–109). Petitioner asserts further that Gitman teaches second nodes that

operate as claimed when its repeaters implement the search protocol after encountering blocking. Pet. 23–24, 25 (citing Ex. 1005, 927, 928, 929; Ex. 1003 ¶¶ 110–114). Gitman teaches that, in this protocol, repeaters select the “label” of a node to reroute a packet, and teaches that the label of a repeater defines the “complete path between the station and a repeater.” Ex. 1005, 928.

Petitioner asserts it would have been obvious to use “Gitman’s teaching of affirmatively initiating and selecting each step in a new route *at the second node* in implementing Burchfiel’s dynamic routing, to advantageously improve the likelihood of successfully transmitting packets.” Pet. 25 (citing Ex. 1004, 247; Ex. 1003 ¶ 114). Petitioner further asserts that using Gitman’s methods in this regard would “improve the likelihood of a packet reaching its intended destination using the ‘next shortest path.’” *Id.* at 13 (citing Ex. 1004, 247–48; Ex. 1003 ¶ 65). According to Petitioner, the modification to Burchfiel would further “provid[e] the station with updated network connectivity information, whereby, *e.g.*, the station can detect ‘persistent alternate routing of packets’ signaling repeater failure, as disclosed by Burchfiel.” *Id.* at 13–14 (citing Ex. 1003 ¶ 66, Ex. 1005, 928–29, Fig. 2; Ex. 1004, 247, 250).

Patent Owner argues that the combination does not teach the claimed “selecting,” because no system chooses between at least two routes to the station. PO Resp. 23. Patent Owner argues first that Burchfiel does not teach the claimed selection. *Id.* at 23–24. As noted above, however, in this challenge, Petitioner relies on Gitman’s teaching of selection, not

Burchfiel's.¹³ Patent Owner argues further that Gitman teaches the station establishing routes during initialization, by assigning a label to each repeater, and that the initialization process thus does not teach claimed second nodes. *Id.* at 24–25. Again, that argument does not address the combination asserted by Petitioner, which relies on the search process, not the initialization process, for the claimed selection.

Patent Owner argues also that, in Gitman, a searching repeater uses the label from a single responding repeater, and thus Gitman does not teach a searching repeater that chooses among at least two alternative routes to the station. *Id.* at 25–26. Petitioner responds that, because a searching repeater must opt to use the address of a responding repeater rather than using the previously stored route for a packet, the searching repeater selects among alternative routes. Reply 10–11 (citing Ex. 1005, 928–29, Fig. 2; Ex. 1032 ¶ 60; Pet. 23–24).

We conclude that, on balance, Petitioner has the more persuasive position in light of the record. A repeater in Gitman that encounters blocking and employs the search algorithm makes a choice to use the label received from a responding receiver instead of the label in the blocked packet. In this, we credit the testimony of Petitioner's expert, Mr. Geier (Ex. 1032 ¶ 57), over that of Patent Owner's expert, Dr. Almeroth (Ex. 2002 ¶ 126–128). Dr. Almeroth makes the distinction that the label in the blocked packet "is no longer available and is therefore not a viable choice" (Ex. 2002 ¶ 126), but the claims do not require selecting between two paths that are known to

¹³ We determined in our Institution Decision that Burchfiel's repeaters, although performing local routing, only specify the "address for the next hop" and therefore do not select a "link," as claimed. Inst. 11.

be viable. Moreover, the path contained in the blocked packet was considered by the system to be viable, because it was assigned to the repeater by the station during initialization. *See* Ex. 1005, 928 (“The techniques suggested assign, during initialization, routing information to repeaters.”).

Additionally, Dr. Almeroth asserts that Gitman’s repeater “is only attempting to identify an alternative next hop and not a path from the client to the station” (Ex. 2002 ¶ 127), but Gitman discloses that a repeater’s label includes “names in a special compact representation of all repeaters on a shortest path to the station” (Ex. 1005, 928). Finally, Dr. Almeroth asserts that Gitman’s searching repeater does not select among paths because it “substitutes the label of the responding repeater into the original packet and transmits the packet” (Ex. 2002 ¶ 128), but, as explained above, the choice made by a searching repeater is to identify and use an alternate path instead of the path contained in the blocked packet.¹⁴ Gitman teaches the search protocol as a strategy to overcome blocking in a transmission path and when a repeater uses the search strategy, it selects a transmission path to the station.

Petitioner asserts also that, because Gitman’s search strategy sends packets to a “class of repeaters sought” (Ex. 1005, 929) and its “routing strategy identifies shortest path (minimum hop) between repeaters and stations” (*id.* at 928), a searching repeater may receive multiple responses

¹⁴ Our conclusion that Gitman teaches a second node (repeater) selecting a path to the first node (station) comports with the decision made by another panel in a related case where Patent Owner made the same argument against the same combination of references. *See* IPR2017-00007, Paper 42, 16.

from neighboring repeaters and would “select the shortest alternate route before retransmitting.” Pet. 12–13 (citing Ex. 1003 ¶ 65), 23–24 (citing Ex. 1003 ¶¶ 110–114); Reply 8–9; Tr. 15:10–16:11. Patent Owner contests this theory of “selecting,” asserting that although a searching repeater may send a search packet to a class of repeaters, Gitman describes only a single repeater responding. PO Resp. 25–26. In our view, Gitman’s “class of repeaters,” in combination with Gitman’s instruction that routing generally seeks the “shortest path (minimum hop) between repeaters and stations” but may also “allow departures from the first choice path and use of next shortest paths” (Ex. 1005, 928), renders obvious a second node receiving multiple responses to a search packet and selecting among those responses to optimize the route to the station. *See* Ex. 1003 ¶ 114; Ex. 1032 ¶¶ 58, 61–63.¹⁵ We conclude that a system that receives multiple responses after sending a search packet to a class of repeaters, in combination with a motivation to identify the shortest path to the station, provides an independent reason that Gitman renders obvious “selecting a transmission path to the said first node.”

Patent Owner argues further that because Gitman discloses the search protocol as only applicable to certain situations (i.e., when a repeater encounters blocking), it does not meet the claim’s requirement that each repeater initiate and select a transmission path. PO Resp. 26–27. The claims, however, do not require that each repeater initiate and select a transmission path for each packet transmitted. Rather, claim 37 requires “implementing in

¹⁵ We note further that Patent Owner’s declarant, Dr. Almeroth, appears to accept that multiple repeaters may respond to a searching repeater in Gitman. *See* Ex. 2002 ¶ 137.

each of a plurality of second nodes a second node process including . . . selecting a transmission path.” Ex. 1001, 30:45–60. Thus, it is adequate that the asserted combination teaches a second node implementing a program that includes Gitman’s search protocol.

Patent Owner also challenges whether a person of ordinary skill had reason to use Gitman’s search protocol with Burchfiel’s repeaters. Patent Owner argues that Gitman’s search protocol is complex and beyond the capabilities of the repeaters in Burchfiel. PO Resp. 31 (citing Ex. 2002 ¶ 135). Petitioner responds that Gitman does not require a complex algorithm and that Burchfiel’s repeaters are already capable of implementing Gitman’s algorithm. Reply 13. We agree with Petitioner. Patent Owner’s argument on the modifiability of Burchfiel’s repeaters is inconsistent with its argument that Gitman’s search algorithm does not select an alternative route. In its “selecting” argument, Patent Owner asserts that Gitman’s repeaters simply use a response to the search packet to route the blocked packet. *See* PO Resp. 23–24, 26. We find that a person of ordinary skill would not have considered Gitman’s search protocol too complex to implement in Burchfiel’s repeaters. In that determination, we credit the testimony of Mr. Geier (Ex. 1032 ¶¶ 67–68) over that of Dr. Almeroth (Ex. 2002 ¶¶ 135–138). We note that Burchfiel already discloses local routing by its repeaters, allowing the repeaters to specify the next hop for a blocked packet. Ex. 1004, 247 (“Dynamic routing changes are performed locally within the PRN by permitting a repeater to specify an alternate address for the next hop after some number of unsuccessful attempts to forward the packet along its specified route.”). Dr. Almeroth asserts that each of Burchfiel’s repeaters “merely retrieves a next hop address from its stored routing parameters”

(Ex. 2002 ¶ 136), but this contradicts Burchfiel’s disclosure that “[r]epeaters should also have ability to trigger local repeaters, or to get local repeaters to bounce back search packets” (Ex. 1004, 247). We conclude that Petitioner’s declarant reaches conclusions more aligned with the disclosures of the references.

Patent Owner similarly argues that Burchfiel teaches away from adding complexity to its repeaters by stating that a repeater must “operate unattended in relatively remote areas for long periods of time” and “must therefore be a simple, low-powered component.” PO Resp. 34 (quoting Ex. 1004, 245). As discussed above, however, a person of ordinary skill would have been able to implement Gitman’s search protocol in Burchfiel’s repeaters. Burchfiel already discloses some degree of local routing in its repeaters. Ex. 1004, 247. In light of the foregoing, we conclude that Burchfiel’s statements do not discourage using Gitman’s search algorithm.

We further find that any modification required to Burchfiel’s repeaters would be well within the ordinary skill in the art. *See In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1382 (Fed. Cir. 2007) (“[W]e do not ignore the modifications that one skilled in the art would make to a device borrowed from the prior art.”). In that conclusion, we credit the testimony of Petitioner’s declarant, who opines that any minor modification required to implement Gitman’s search protocol would have been obvious to a person of ordinary skill at the time. Ex. 1032 ¶¶ 69-72.

Although Patent Owner asserts that using Gitman’s search protocol would duplicate functionality already in Burchfiel without benefit (PO Resp. 35), we agree with Petitioner and find that a person of ordinary skill had reason to make the modification because “Gitman’s protocol

instead advantageously improves the likelihood of successfully transmitting packets across the network by selecting the “next shortest path[.]” Reply 10 (citing Pet. 25, 10–14; Ex. 1005, 928–29; Ex. 1032 ¶ 72).

Claim 37 recites “maintaining a second node link tree having second node link entries representing each of the plurality of second nodes at the first node.” To show this limitation, Petitioner relies on Burchfiel’s disclosures that the station maintains a connectivity matrix and connection table, and updates the connection table to establish new routes when it detects “persistent alternate routing” by repeaters that encounter blocking. Pet. 25–27 (citing Ex. 1004, 247 (“The station uses search packets arriving to generate the connectivity matrix, and relabel (or initially label) the net. . . . Once the station has labelled all PRU’s and established connections to them, the information for maintaining these connections is entered into the station’s connection table. . . . [E]ach terminal is also given a connection to its controlling station, and this information is added to the station’s connection table.”), 247–48 (“[W]hen a repeater . . . fails: persistent alternate routing of packets signals this failure, and the station detecting it must reconfigure the PRN . . . by updating the connectivity matrix . . .”), 250 (“[T]he connection table . . . holds all status information for every connection being maintained by the station. . . . The control process . . . caus[es] dynamic routing changes in response to changes in repeater-terminal propagation connectivity or repeater failures. It is responsible for keeping the propagation connectivity matrix up to date.”); Ex. 1003 ¶¶ 115–128, 138).

Patent Owner argues that “Burchfiel does not describe its connection table is in the form of a tree (i.e., a graph with no cycles.)” PO Resp. 28

(citing Ex. 2002 ¶¶ 130–131). Petitioner responds that “Burchfiel teaches that its connection table stores only one ‘connection’/‘route’ per repeater that extends between the repeater and the station, and thus cannot form a cycle.” Reply 15 (citing Ex. 1004, 247 (“[S]tation has labelled all PRU’s and established connections to them, the information for maintaining these connections is entered into the station’s connection table.”; “each terminal is also given a connection”; “connections from the station to each repeater”), 246 (“connection is bi-directional”), 250; Ex. 1032 ¶ 79). Petitioner further emphasizes that forming connections with cycles would not be consistent with Burchfiel’s expressed desire to use “minimum distance” connections. *Id.* at 15–16 (citing Ex. 1032 ¶ 79). In light of Burchfiel’s disclosures that it generates one connection from each repeater to the station, and that it seeks minimum-distance connections, we conclude that Petitioner’s position is more persuasive.

Patent Owner also argues that “language in the dependent claims implies that the link entries comprise at least some links that have been selected by a second node,” because selected links are compared to tree entries in dependent claims 22, 25, and 38. PO Resp. 28–29. According to Patent Owner, a comparison requires the links be in the same direction, so the tree cannot contain links created by the first node to compare with a link created by a second node. PO Resp. 29–30 (“[N]o direct comparison is possible without further additional processing.”). Petitioner contests this argument, pointing out initially that it would improperly incorporate limitations of the dependent claims into the independent claims. Reply 16. Even assuming the link tree must allow for comparison, we agree with

Petitioner that Burchfiel discloses “bi-directional” communication using a single route. Reply 17 (citing Ex. 1004, 245–47; Ex. 1032 ¶¶ 83–84).

Regarding the type or degree of comparison, Patent Owner argues that the Specification of the ’496 patent describes determining whether one path “is the same as” another path.” PO Resp. 30 (quoting Ex. 1001, 13:31–34). We do not agree that the claims should be interpreted to require a particular method of comparison or even a “direct” comparison. This understanding is consistent with other disclosures in the Specification, relating to the ease with which a path may be reversed. *See* Reply 17 (citing Ex. 1001, 22:34–37 (“The simplest way of determining the reverse address is simply reverse the link section of the header portion of the data packet of FIG. 21*b* to provide a return address of 21*c*.”), 22:45–48 (“As will be appreciated by those skilled in the art, this type of reverse tree transversal is easily accomplished with a recursive function.”); Ex. 1032 ¶¶ 83–84).

In light of the foregoing, we find that Burchfiel’s connection table teaches “maintaining a second node link tree having second node link entries representing each of the plurality of second nodes at the first node” as recited in claim 37.

b. Objective indicia of nonobviousness

Patent Owner argues that several objective indicia show that the subject matter of the challenged claims would not have been obvious to a person of ordinary skill. PO Resp. 49–56. Any such evidence requires a nexus between the claimed invention and the evidence of nonobviousness. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). Patent Owner asserts that the invention satisfied a long-felt but unmet need and produced

unexpected results, and that these considerations have a nexus with the challenged claims.

Patent Owner asserts there was a long-felt and unmet need for “a packet-based wireless computer network that is both robust and efficient.” PO Resp. 49 (quoting Ex. 1001, 4:39–47). During prosecution of a parent to the ’496 patent, Dr. Brownrigg, a named inventor, submitted an affidavit asserting that routing overhead was a significant problem when performing distributed routing because the routing operations consumed system bandwidth. Ex. 2006 ¶ 11. The Specification of the ’496 patent also asserts that prior approaches to packet routing resulted in packet duplication and network congestion. Ex. 1001, 2:52–3:8, 3:20–25. Patent Owner asserts also that two articles relied on in the prosecution affidavit described that routing overhead was known to be “directly proportional to the number of nodes in the wireless network.” PO Resp. 52 (citing Ex. 2006 ¶ 19; Ex. 2002 ¶¶ 181–182; Ex. 2004; Ex. 2005; Ex. 2007). Finally, Patent Owner asserts that the ’496 patent satisfied the unmet need for the same reasons that it produced unexpected results. PO Resp. 51.

Regarding unexpected results, Patent Owner asserts that, whereas in the prior art, routing overhead was proportional to the number of nodes, a simulation performed by Dr. Brownrigg showed the opposite result—average hop distance decreasing with an increase in number of nodes. PO Resp. 52–53. According to Dr. Brownrigg, he realized that he could achieve such performance with “an extreme form of a conventional sorting and searching algorithm.” *Id.* at 52 (quoting Ex. 2006 ¶ 21). Dr. Brownrigg asserts that his simulation showed the unexpected result of “increase[ing] the network bandwidth as nodes were added” to the wireless network. *Id.* at 53

(quoting Ex. 2006 ¶ 26). Dr. Brownrigg explains in his affidavit that his invention “included an optimization process to minimize the number of hops from one of the clients to the server” involving “eavesdropping.” See Ex. 2006 ¶ 23. Regarding the weight of Patent Owner’s evidence itself, we agree with Petitioner that Dr. Brownrigg’s affidavit does not include details sufficient to support reliance on the test he performed. Reply 25 (citing Ex. 1032 ¶¶ 111–115); 37 C.F.R. § 42.65(b). Dr. Brownrigg does not explain the details of his test, instead referring to another declaration that does not appear to be of record in this proceeding. Ex. 2006 ¶ 24. Thus, we conclude that Dr. Brownrigg’s affidavit does not provide reliable evidence of unexpected results.

Patent Owner relies also on the declaration of Dr. Almeroth. PO Resp. 52–53 (citing Ex. 2002 ¶¶ 180–187). Dr. Almeroth, however, relies on Dr. Brownrigg’s affidavit, providing no further evidence of unexpected results. See Ex. 2002 ¶¶ 180–187. Dr. Almeroth does not evaluate how the invention claimed in the ’496 patent offers results unexpected as compared to the prior art at issue, Burchfiel or Gitman. We conclude that Dr. Almeroth’s declaration is entitled to little weight. *Bristol-Myers Squibb Co. v. Teva Pharm. USA, Inc.*, 752 F.3d 967, 977 (Fed. Cir. 2014) (“To be particularly probative, evidence of unexpected results must establish that there is a difference between the results obtained and those of the closest prior art, and that the difference would not have been expected by one of ordinary skill in the art at the time of the invention.”).

To show a nexus between the evidence of meeting a long-felt need or providing unexpected results, Patent Owner asserts that the claimed invention provided improved network bandwidth “by employing both

centralized and decentralized features in which a server maintains a tree with paths (centralized) and clients select paths to the server independently (decentralized).” PO Resp. 55 (citing Ex. 2002 ¶ 189).¹⁶ Patent Owner’s declarant, Dr. Almeroth, asserts that the hybrid approach—clients selecting a transmission path and a server maintaining a tree with paths—unexpectedly reduced routing overhead and solved the long-felt need. Ex. 2006 ¶ 189. But Dr. Almeroth does not support that assertion with any facts, data, or analysis and we expressly do not agree with Patent Owner that Dr. Almeroth has demonstrated that certain routing features reduce routing overhead and solve long-felt need. See PO Resp. 55. We thus accord Dr. Almeroth’s declaration little weight on the issue of nexus. See 37 C.F.R. § 42.65 (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

Petitioner argues that any benefit to network bandwidth in the inventors’ work came from the process of eavesdropping, but that the claims do not require that process, and the objective evidence therefore lacks nexus. Reply 26. A named inventor, Dr. Brownrigg, testified that “eavesdropping” is an essential part of the optimization process if a node determines that information from another node would represent a routing improvement. Ex. 1045, 41:16–42:1. This agrees with statements in Dr. Brownrigg’s affidavit that assert his invention included an optimization/discovery process. Ex. 2006 ¶ 23; Ex. 1045, 36:2–15 (noting the optimization and

¹⁶ Patent Owner does not identify a commercial embodiment that practices the claimed invention and therefore is not entitled to a presumption of nexus. See *WBIP v. Kohler Co.*, 829 F.3d 1317, 1329 (Fed. Cir. 2016).

discovery process were the same process). Dr. Almeroth testified that the claims neither specifically require nor prohibit the eavesdropping process. Ex. 1046, 101:20–103:14. We agree with that assessment of the claims. Significantly, because the claims do not require Dr. Brownrigg’s eavesdropping process and instead require, more generally, maintaining a central routing tree and performing distributed routing, the asserted benefits and unexpected results of Dr. Brownrigg’s work were not due to the merits of the invention claimed in the ’496 patent. *See JT Eaton & Co. v. Atlantic Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1994) (“[T]he asserted commercial success of the product must be due to the merits of the claimed invention beyond what was readily available in the prior art.”).

Petitioner’s expert, Mr. Geier, explains that prior-art networks already taught a hybrid centralized-distributed approach, as in Burchfiel. Ex. 1032 ¶ 109. The distinction that Patent Owner has raised regarding Burchfiel—that the client nodes perform routing by specifying a next hop rather than a full transmission path—does not relate to any aspect Patent Owner asserts provided an unexpected benefit. Mr. Geier also testifies that the claims do not recite features that reduce overhead or increase bandwidth. *Id.* ¶ 118.

Having reviewed the record, we conclude that Patent Owner has not shown the required nexus between any objective evidence of nonobviousness and the claims.

On balance, we view Patent Owner’s evidence regarding long-felt need or unexpected results as providing weak, if any, support for a conclusion of nonobviousness. These findings and conclusions regarding Patent Owner’s objective indicia of nonobviousness apply to all of the claims and grounds for unpatentability.

c. Conclusion

Petitioner’s showing of obviousness satisfies the legal thresholds and outweighs Patent Owner’s showing of nonobviousness. *See Leapfrog*, 485 F.3d at 1162 (concluding that objective considerations of nonobviousness including substantial evidence of commercial success, praise, and long-felt need, were “inadequate to overcome a final conclusion” that the claim at issue would have been obvious). Thus, based on the record, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claim 37 would have been obvious over Burchfiel and Gitman.

4. Claims 21, 24, and 45

Independent claim 24 recites limitations substantially similar to those of claim 37, further requiring “rerouting data packets around inactive or malfunctioning second nodes.” Ex. 1001, 28:3–4. Petitioner asserts that Burchfiel teaches this limitation. Pet. 35–39 (citing Ex. 1004, 247–48, 250; Ex. 1003 ¶¶ 181–192, 195–200, 209; contentions for claims 37 and 38). Petitioner asserts that Burchfiel and Gitman render the remaining subject matter of claim 24 obvious for the same reasons as for claim 37. Pet. 34–40.

Independent claims 21 and 45 recite limitations substantially similar to those of claim 37. Petitioner asserts that Burchfiel and Gitman render the subject matter of claims 21 and 45 obvious for the same reasons as for claims 37 and 24. Pet. 40–50.

Patent Owner does not contest Petitioner’s assertions regarding claims 21, 24, or 45, other than as discussed above regarding claim 37. Based on the record, we find that the combination of Burchfiel and Gitman teaches the limitations of claims 21, 24, and 45 and that a person of ordinary skill had

reason to combine Gitman’s teachings regarding repeater routing with those of Burchfiel as asserted by Petitioner. As with claim 37, we conclude that Patent Owner’s evidence of nonobviousness does not outweigh Petitioner’s evidence of obviousness.

Based on the record, we conclude that Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 21, 24, and 45 would have been obvious over Burchfiel and Gitman.

5. Claims 22 and 38

Claim 38 depends from claim 37 and further requires “comparing a selected link . . . to a second node link entry in said second node link tree” and “updating said second node link tree when said comparison meets at least one of several predetermined conditions.” Claim 22 recites parallel limitations.

Petitioner asserts that Burchfiel teaches claim 38’s comparing step by disclosing that the “persistent alternative routing of packets signals” failure of a repeater and a “station detecting [that alternative routing] must reconfigure the PRN to route all traffic around the failed element.” Pet. 29–30 (quoting Ex. 1004, 247–48, 250; citing Ex. 1003 ¶¶ 139–149). Petitioner also relies on Gitman’s teaching of a “selected link,” in that Gitman discloses using the responding repeater’s label in the header of a packet that encounters blocking, so that label—the selected link—would be available to allow Burchfiel’s station to detect “persistent alternate routing.” *Id.* at 30–31 (citing Ex. 1003 ¶¶ 150–152).

Patent Owner argues that neither Burchfiel nor Gitman teaches the “comparing” limitation of claim 38. PO Resp. 38–42. Patent Owner and its declarant rely on separate disclosures in Burchfiel of network initialization

and control messages and assert that “persistent alternate routing” must be detected and accommodated with those mechanisms, not by comparing a selected route with one in the link tree. PO Resp. 40 (citing Ex. 2003 ¶ 153); *accord id.* at 48 (citing Ex. 2003 ¶ 167).

We agree with Petitioner that Burchfiel’s disclosure of a station detecting “persistent alternate routing of packets” and responding by reconfiguring the network “to route all traffic around the failed element” falls outside of Burchfiel’s initialization algorithm and control connection. Pet. 29–30; Reply 21. Burchfiel discloses that functionality in the context of repeaters making dynamic routing changes that are then detected by the station. Ex. 1004, 247–48. It discloses the initialization algorithm as wholly separate from dynamic routing changes. *Id.* Thus, we find the initialization algorithm is separate from, and not relevant to, Petitioner’s assertions of repeater routing. Further, the existence of a “control connection,” by which the repeaters and station may communicate, does not contradict the station “detecting” such a change. *Id.* at 247–48, 250. In the control channel, a repeater may inform the station of significant routing events by forwarding information over the control connection. *Id.* at 250. By phrasing the dynamic-routing process in terms of the station “detecting” a change, Burchfiel indicates that it does not occur through the control channel. In this regard, we credit the testimony of Mr. Geier. Ex. 1032 ¶ 88.

Thus, although Burchfiel does not expressly state that the routes of alternatively routed packets (included in packets rerouted according to Gitman’s teachings) are “compared” with routes in the link tree (Burchfiel’s connection table), Burchfiel’s disclosures support that one of ordinary skill

would understand Burchfiel to be teaching such a comparison. *See* Ex. 1003 ¶¶ 144–147.

Additionally, we agree with Petitioner that it would have been obvious to a person of ordinary skill to configure a system to perform the comparing step, because the required information—the existing route and the route used by a repeater avoiding a blockage—would be present in a system following the combined teachings of Burchfiel and Gitman. *See* Ex. 1005, 929 (disclosing that a rerouted packet includes its full path); Pet. 30. As Petitioner explains, such a solution would have advantageously used information already present without requiring “additional communication signaling the node failure.” Pet. 30 (citing Ex. 1003 ¶ 148).

Regarding the “updating” limitation, Petitioner relies on Burchfiel’s disclosure of updating the connectivity matrix and connection table after detecting a dynamic routing change. Pet. 31–33 (citing Ex. 1004, 247–48, 250; Ex. 1003 ¶¶ 153–157). Petitioner further asserts it would have been obvious to a person of ordinary skill to update the connection table “in order to advantageously avoid routing through failed repeaters.” *Id.* at 33.

Patent Owner argues that because the route selected by a blocked repeater in Gitman “may not reflect an ‘optimized path,’” Burchfiel’s station could not use that path to update its connection table. PO Resp. 43. Fundamentally, Patent Owner’s argument imposes a requirement beyond that of the claims. Claims 22 and 38 do not require updating the link tree to include the selected route. Thus, when Burchfiel discloses “updating the connectivity matrix to indicate that the failed element is incommunicado,” that satisfies the language of claims 22 and 38. Additionally, Patent Owner does not identify a disclosure in Burchfiel that the connection table may only

include a path known to be optimized. The path used by a repeater for a dynamic routing change represents a solution to a routing problem; it logically indicates to the station that the path selected by the repeater is more optimal than the path previously in the connection table (because the previous path resulted in a blocked packet). Thus, we do not agree with Patent Owner that there would be some inconsistency in Burchfiel using the detected path in the connection table.

Patent Owner argues also that, because updating the “second node link tree” must occur when the “comparison meets at least one of several predetermined conditions,” those conditions “must relate to some characteristic or property of the two routes, or their differences.” PO Resp. 44. In Patent Owner’s view, “persistent alternate routing” or terminals coming on-line, as disclosed by Burchfiel, “would trigger differences in routes under comparison and therefore cannot be used as criteria to update the connection table.” *Id.* We do not understand Patent Owner’s argument to raise a distinction over the prior art. As Petitioner points out, persistent alternate routing relates to a characteristic of the routes used by packets, and therefore satisfies Patent Owner’s view of the claims. Reply 23. Moreover, the claims do not require any particular type of predetermined condition, so we do not find Patent Owner’s argument persuasive.

Patent Owner argues further that Burchfiel does not satisfy the requirement for “an ‘update’ to be performed based upon the result of the comparison step” because Burchfiel updates the connection table after “recomputing minimum distance routes.” PO Resp. 45–46 (citing Ex. 1004, 248). That argument is not persuasive because Burchfiel discloses that the

entire process is triggered by the station detecting persistent alternate routing of packets—that detection occurs through a comparison and results in an update to the connection table’s routing parameters. As discussed above, we do not agree with Patent Owner’s assertion that Burchfiel’s “station disregards any information in the ‘route’ field in packets received,” PO Resp. 48 (citing Ex. 2002 ¶ 167). That assertion is made without adequate support in Burchfiel’s disclosures.

Based on the foregoing discussion and having reviewed the record, we find that both Burchfiel and the combination of Burchfiel and Gitman teach the limitations of claims 22 and 38.

Accordingly, having considered the record, including the objective indicia of nonobviousness addressed above, we conclude that Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 22 and 38 would have been obvious over Burchfiel and Gitman.

D. OBVIOUSNESS OVER BURCHFIEL, GITMAN, AND KAHN⁷⁵

Petitioner asserts that the combined teachings of Burchfiel, Gitman, and Kahn⁷⁵ would have rendered the subject matter of claims 23 and 39 obvious to one of ordinary skill in the art at the time of invention. Pet. 5, 51–52, 55–70.

1. Kahn⁷⁵ (Ex. 1007)

Kahn⁷⁵ discusses “the use of packet radio communication for organizing computer resources into a computer communications network.” Ex. 1007, 177. In one aspect, Kahn⁷⁵ teaches a mechanism “to verify the authenticity of both the sender and the receiver in each stage of the communication process.” *Id.* at 183–84.

2. Claims 23 and 39

As we note in the chart of asserted grounds, *supra*, Petitioner includes “admitted prior art” (“APA”) to support that certain limitations were known in the art. Pet. 5–6, 50–52. We consider statements in the Specification of the ’496 patent informative of the knowledge of a skilled practitioner. As discussed in more detail below, Petitioner has used APA to support teachings in Burchfiel and Kahn⁷⁵ and has provided the published references referred to in the Specification of the ’496 patent. Thus, Petitioner does not rely solely on statements in the Specification of a challenged patent for a teaching asserted in a ground of unpatentability.

Claim 39 depends from claim 37 and requires “determining if one of the plurality of said second nodes is authentic.” Ex. 1001, 31:1–11. Petitioner asserts that Kahn⁷⁵ teaches this limitation by disclosing an algorithm for “verifying that traffic being received from a so-called repeater *B* is actually coming from an authentic repeater *B*.” Ex. 1007, 183–84; Pet. 56–57 (additionally citing Ex. 1003 ¶¶ 326–333; Ex. 1007, 179, 182–83). Petitioner further points out that the Specification of the ’496 patent states that “[a]uthentication techniques are well known to those skilled in the art” and incorporates a book by James F. Gimpel, provided here as Exhibit 1011 (“Gempel”). Ex. 1001, 15:14–29; Ex. 1011, 348–50; Pet. 57 (additionally citing Ex. 1003 ¶¶ 334–337).

Claim 39 further requires, if the second node is authentic, “deleting one of the plurality of said second nodes from said second node link tree if one of the plurality of said second nodes . . . is already in said second node link tree” and “inserting one of the plurality of said second nodes in said second node tree if said second node . . . is not already in said client link

tree.” Ex. 1001, 31:1–11. Petitioner asserts that Burchfiel teaches this limitation because it teaches using “search packets arriving [at the station] to generate the connectivity matrix, and relabel . . . the net.” Ex. 1004, 247; *accord id.* at 250 (“When repeater connectivity changes the station will update the connectivity matrix and reconfigure the network to bypass the failed link by modifying the routing control parameters in time effected repeaters.”); *see also* Pet. 59–60, 62–63 (additionally citing Ex. 1003 ¶¶ 338–347). Petitioner further points out that the Specification of the ’496 patent states that “[t]he addition and removal of nodes from trees are well known in those skilled in the art” and incorporates a book by Ralph E. Giswold, provided here as Exhibit 1010 (“Giswold”). Ex. 1001, 14:61–67; Ex. 1010, 87–88; Pet. 60 (additionally citing Ex. 1003 ¶¶ 348–349).

Claim 23 recites limitations parallel to those of claim 39 and Petitioner relies on the same assertions for claim 23 as made for claim 39. *See* Pet. 64–68.

Petitioner asserts that a person of skill in the art at the time of invention had reason to use the teachings of Kahn⁷⁵ and the teachings referenced in the Specification of the ’496 patent (the APA) in combination with Burchfiel. Pet. 51–52. In particular, Petitioner asserts that a person of skill “would have found it obvious and straightforward to apply Kahn⁷⁵’s authentication techniques in implementing Burchfiel’s station whereby its software contains logic that checks whether the terminal/repeater is able to provide proper verification and advantageously prevents unauthorized access.” Pet. 51 (citing Ex. 1007, 183; Ex. 1003 ¶ 312). Petitioner also asserts that “[t]he APA’s authentication method [taught in Gimpel] advantageously adds a layer of security by camouflaging the ‘seed.’” Pet. 52

(citing Ex. 1003 ¶ 313). Petitioner argues that using the tree-alteration techniques taught by Giswold would allow a person of skill “to efficiently alter the table/tree.” Pet. 50.

Based on the foregoing discussion and having considered the record, we find that Kahn75 teaches the limitations of claims 23 and 39 and that a person of ordinary skill had reason to use Kahn75’s teachings with those of Burchfiel and Gitman as claimed.

Patent Owner does not contest Petitioner’s assertions for claims 23 or 39, other than as described above for the independent claims from which claims 23 and 39 depend. Based on the record, we conclude Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 23 and 39 would have been obvious over Burchfiel, Gitman, and Kahn75.

E. ADDITIONAL GROUNDS OF UNPATENTABILITY

The parties informed the Board that they agreed to “forego additional discovery, briefing and argument” on the grounds added by our order of April 26, 2018 (Paper 41). Ex. 3002.

Because we conclude each challenged claim is unpatentable over Burchfiel and Gitman, or over Burchfiel, Gitman, and Kahn75, we do not address other grounds for unpatentability, which would not change the scope of our order.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that:

- a) Claims 21, 22, 24, 37, 38, and 45 are unpatentable under 35 U.S.C. § 103(a) as obvious over Burchfiel and Gitman; and
- b) Claims 23 and 39 are unpatentable under 35 U.S.C. § 103(a) as obvious over Burchfiel, Gitman, and Kahn75.

IV. ORDER

Accordingly, it is:

ORDERED that claims 21–24, 37–39, and 45 of the '496 patent are unpatentable.

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.

Case IPR2017-00213

Patent 8,625,496 B2

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