

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TP-LINK CORPORATION LIMITED,
Petitioner,

v.

NETGEAR, INC.,
Patent Owner.

IPR2023-01429
Patent 10,278,179

Before LYNNE H. BROWNE, SHEILA F. McSHANE, and
JASON M. REPKO, *Administrative Patent Judges*.

REPKO, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

TP-Link Corporation Limited (“Petitioner”) filed a petition requesting *inter partes* review of claims 1–19 of U.S. Patent No. 10,278,179 (Ex. 1001, “the ’179 patent”). Paper 2 (“Pet.”). Netgear, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).

To institute an *inter partes* review, we must determine “that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). For the reasons discussed below, Petitioner does not show a reasonable likelihood that it would prevail with respect to any claims challenged in the Petition. Thus, we deny institution of *inter partes* review.

A. Related Matters

The parties indicate that the ’179 patent is involved in the following International Trade Commission investigation: Inv. No. 337-TA-1361 (ITC). Pet. 89; Paper 4, 1 (Patent Owner’s Mandatory Notice).

The parties also indicate that the ’179 patent is involved in the following district-court proceeding: *Netgear Inc. v. TP-Link USA Corp. et al.*, Case No. 2:23-cv-02540 (C.D. Cal.). *Id.*

B. Real Party in Interest

Petitioner identifies TP-Link Corporation Limited f/k/a TP-Link International Ltd., TP-Link Technologies Co., Ltd., TP-Link USA Corp., and TP-Link Institute USA Corp. d/b/a TP-Link Research America Corp. as the real parties-in-interest. Pet. 89. Patent Owner identifies Netgear, Inc. as the real party-in-interest. Paper 4, 1.

C. The ’179 Patent

The ’179 patent is generally directed to configuring a wireless mesh network. Ex. 1001, Abstract. A wireless mesh network uses a scattered

distribution of access points (APs). *Id.* at 2:3–5. These mesh networks can cover areas that are too large for a single AP. *See id.* at 1:49–2:16. The mesh points provide regular wireless local area networks (WLAN) services, including data packet forwarding to and from the gateway and the Internet. *Id.* at 27:8–14. Apart from those functions, the mesh points can use telecommunication circuits to form dedicated backhaul links. *Id.* The backhaul links can perform control-and-management functions or provide, for example, more throughput or fault tolerance. *Id.* at 27:14–22. The disclosed system measures or estimates the current backhaul link's, or other possible link option's, performance as compared to other link options. *Id.* at 27:51–55. The measurements are used to select the most suitable backhaul link. *Id.*

D. Claims

Of the challenged, claims 1 and 11 are independent. Claim 1 is reproduced below.

1. A computer-implemented method for implementing a dedicated backhaul in a wireless mesh network formed with one or more mesh points, the method being performed by a first mesh point and comprising:
 - establishing a forward wireless communication with a second mesh point;
 - establishing a backhaul communication, separate from the forward wireless communication, with the second mesh point,
 - wherein the forward wireless communication is established using a wireless communication technology using frequency bands selected from the group consisting of: a 2.4 GHz band, and a 5 GHz band, and
 - wherein the backhaul communication is established using a communication technology selected from the group

consisting of: a power line based communication, a 2.4 GHz or 5 GHz radio frequency (RF) technology using a dedicated radio, and a sub-1GHz RF technology; and

constructing a list of backhaul candidates, each backhaul candidate having a score indicative of an estimated quality of a potential link between the first mesh point and the second mesh point;

upon determining that a quality of service of the dedicated backhaul has dropped to below a predetermined threshold, establishing an alternative backhaul communication with the second mesh point using a backhaul candidate with the highest score on the list.

Ex. 1001, 31:5–31.

E. Evidence

Name	Reference	Exhibit No.
Gatewood	US 9,001,767 B1, issued Apr. 7, 2015	1005
Handforth	US 7,366,120 B2, issued Apr. 29, 2008	1006
Sinha	US 2008/0304485 A1, published Dec. 11, 2008	1008
Liu	US 2010/0322141 A1, published Dec. 23, 2010	1009

F. Asserted Grounds

Petitioner asserts that claims 1–19 would have been unpatentable on the following grounds. Pet. 1–2.

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1, 2, 4–7, 11, 12, 14–16	103	Sinha, Liu
1–7, 11–16	103	Sinha, Liu
1–19	103	Sinha, Liu, Handforth
1, 3–6, 11, 13–16	103	Gatewood, Sinha

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art “would have had a Bachelor’s degree in electrical engineering, computer engineering,

computer science, or a related field, and three years of experience in the design and analysis of wireless communication systems or equivalent work experience.” Pet. 4 (citing Ex. 1002¹ ¶¶ 48–51). Petitioner also asserts that “[a]dditional education might compensate for a deficiency in experience, and vice-versa.” *Id.*

Patent Owner largely agrees with Petitioner’s assertion, arguing that a person of ordinary skill in the art “would be a person with a bachelor’s degree in a technical field such as electrical engineering, computer engineering, computer science, or physics, and/or 2–3 years of relevant practical experience in wireless communication, data communication, or wireless networking systems.” Prelim. Resp. 10 (citing Ex. 2001² ¶ 25).

The differences between these definitions do not affect our analysis here. For this decision, we adopt Petitioner’s definition.

B. Claim Construction

“The Board is required to construe ‘only those terms . . . that are in controversy and only to the extent necessary to resolve it.’” *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner proposes alternative constructions for the terms “forward wireless communication” and “backhaul communication.” See Pet. 4–7. In this decision, we do not see a need to construe a term to resolve any issues because Petitioner’s rationale fails under all proposed constructions. See *infra* §§ II.C–E.

¹ Exhibit 1002 is the declaration of Dr. Zhi Ding.

² Exhibit 2001 is the declaration of Dr. Zygmunt J. Haas.

C. Obviousness over Sinha and Liu

Petitioner asserts that claims 1, 2, 4–7, 11, 12, and 14–16 are unpatentable as obvious over Sinha and Liu. Pet. 15–44. Petitioner relies on the Sinha-Liu combination in its referenced Grounds IA and IB. *Id.* at 5–6. The main difference between these grounds is Petitioner’s interpretation of “backhaul communication”: back-end/backhaul paths dedicated for carrying control information or that carry data and control information (Ground IA) or back-end/backhaul paths established in a frequency band dedicated for backhaul (Ground IB). *Id.* For the reasons discussed below, Petitioner does not show a reasonable likelihood of prevailing under either ground. Our decision does not depend on Petitioner’s mapping of the term “backhaul communication.”

1. Sinha

Sinha relates to a routing method for packets in a wireless mesh network. Ex. 1008, Abstract. Sinha’s wireless mesh network uses a backhaul topology to or from a root access point (Root AP) to a set of mesh nodes functioning as access points (mesh APs or MAPs). *Id.* ¶ 24. The MAPs may be implemented by a dual-radio wireless station. *Id.* A first radio can provide a backhaul link between the MAPs, and a second lets the node function as an AP. *Id.* ¶ 25.

2. Liu

Liu’s system seeks to maximize network throughput and improve fairness in shared wireless-communication networks. Ex. 1009 ¶ 8. It allocates bandwidth and creates a routing scheme from collected network information. *Id.*, Abstract. Mesh access points (MAPs) measure and report link quality and channel conditions. *Id.* ¶¶ 9, 56. The system uses that

information to update data-forwarding instructions to maximize network throughput and improve fairness. *Id.*

3. *Ground IA*

a. *Claims 1 and 11*

Claim 1 recites,

A computer-implemented method for implementing a dedicated backhaul in a wireless mesh network formed with one or more mesh points, *the method being performed by a first mesh point and comprising*

Ex. 1001, 31:5–8 (emphasis added). Claim 11 recites a similar limitation as a device:

A computing device comprising: one or more processors, that implements a mesh point in a wireless mesh network formed with a plurality of mesh points, *the computing device being configured to perform a method comprising*

Id. at 32:1–5. That is, both claims recite that the method is performed by one device—either a “first mesh point” or a “computing device.” *See id.* at 31:5–8, 32:1–5.

b. *The Petition*

Petitioner asserts that the Sinha-Liu combination renders obvious the first mesh point (claim 1) and the computing device (claim 11). *See* Pet. 19. According to Petitioner, Sinha teaches a lightweight and a non-lightweight architecture. *Id.* at 15 (citing Ex. 1002 ¶¶ 71–72). In Petitioner’s view, Sinha’s lightweight architecture uses a centralized controller that (1) is separate from the MAPs and (2) “controls the operation of the MAPs of a wireless mesh network.” *Id.* (citing Ex. 1008 ¶¶ 26–27, Fig. 1) (emphasis omitted). Petitioner argues that it relies on the non-lightweight architecture for its claim mapping. *Id.* In Petitioner’s view, Sinha’s non-lightweight architecture has a controller integrated in its Root AP (the claimed “first

mesh point”) to perform the claimed method. *Id.* at 19. Alternatively, Petitioner argues that it would have been obvious to integrate the controller in the Root AP based on Liu’s teachings. *Id.* at 17–19.

According to the Petition, the benefits of this integration include “higher integration and reduced communication complexity.” *Id.* at 18. Petitioner argues that reduced cost is an added benefit:

A POSITA would recognize and understand that a non-lightweight architecture that integrates the centralized controller in the network’s RootAP . . . advantageously reduces the number of network devices and connections, thereby reducing complexity and cost.

Id. at 16–17 (citing Ex. 1002, ¶ 75). In Petitioner’s view, these benefits would have motivated one of ordinary skill in the art to modify Sinha. *Id.* at 18. Petitioner argues that integrating the controller in the Root AP would have been (1) obvious to try and (2) nothing more than an application of a known technique to a known system ready for improvement. *Id.* at 18–19.

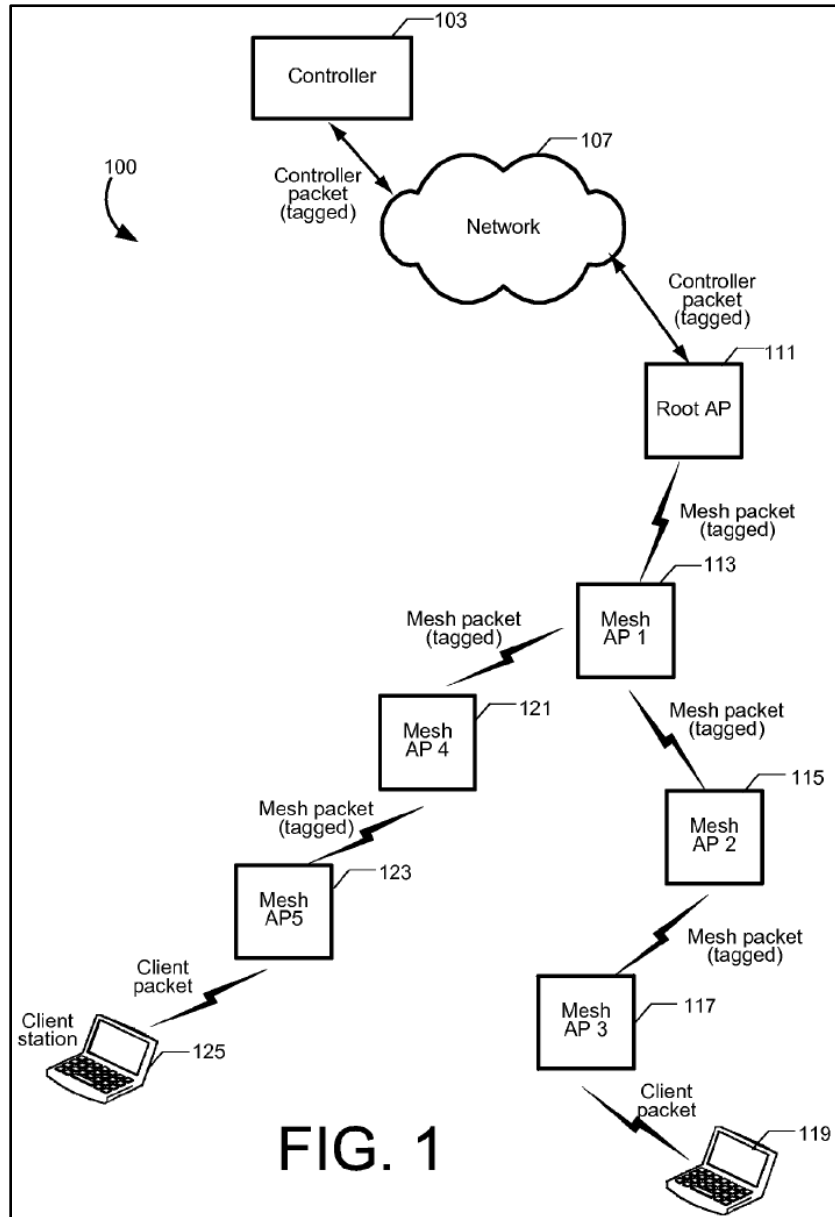
c. Patent Owner’s Preliminary Response

Patent Owner argues that Petitioner’s interpretation of Sinha’s non-lightweight architecture is unsupported and incorrect because Sinha uses a controller in its non-lightweight embodiments. Prelim. Resp. 23–26. Patent Owner also argues that Petitioner does not show that it would have been obvious to modify Sinha’s Root AP to have a controller. *Id.* at 26–33. For the reasons that follow, we agree with Patent Owner.

d. Sinha's Non-Lightweight Architecture

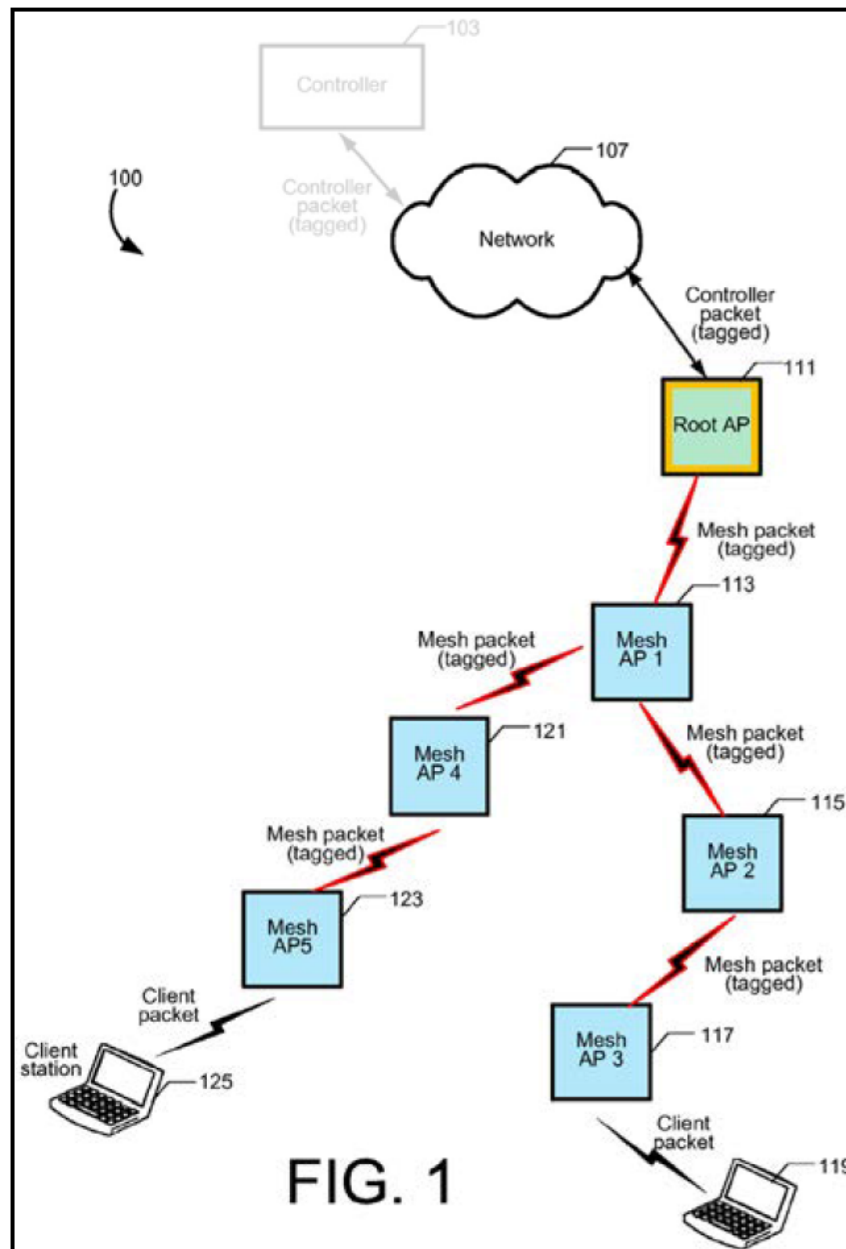
Sinha's Figure 1 shows a centrally controlled mesh network.

Ex. 1008 ¶ 24.



Mesh network 100, shown above, includes a backhaul topology to or from a root access point (Root AP 111). *Id.* ¶ 36. Controller 103 determines a control path. *Id.* For example, the control path between controller 103 and MAP 3 (117) includes Root AP 111, MAP 1 (113), and MAP 2 (115). *Id.*

According to Petitioner, Sinha describes—but does not illustrate—a non-lightweight architecture having controller 103 in a MAP. Pet. 15 (citing Ex. 1008 ¶ 131; Ex. 1002 ¶ 73). Petitioner argues that a person of ordinary skill in the art would have understood and found obvious that controller 103 “could be integrated into any of Sinha’s MAPs.” *Id.* at 16 (citing Ex. 1002 ¶ 74). Petitioner annotates Sinha’s Figure 1 to illustrate this argument. *Id.*



According to Dr. Ding, this modified version of Sinha's Figure 1 is consistent with Sinha's teachings. Ex. 1002 ¶ 74, *cited in* Pet. 14. Modified Figure 1 shows Sinha's centralized controller 103 integrated in Root AP 111. Pet. 16. The figure indicates this by showing (1) controller 103 and its connection to network 107 in grey and (2) Root AP 111 in green with a yellow-and-black border. *Id.* According to the Petition, this allegedly non-lightweight architecture eliminates the need for a controller-to-MAP protocol connection. *Id.* at 15 (citing Ex. 1008 ¶ 131).

To support its argument, Petitioner relies on Dr. Ding's interpretation of Sinha's discussion of MAPs that do not need an LWAPP³ connection for a controller to function:

Note that the description has been mostly for mesh APs that are controlled by a controller with which the mesh AP has a secure tunnel, e.g., an LWAPP/CAPWAP tunnel. First, the invention is also applicable to mesh nodes that do not include access point functionality—such mesh nodes are still called mesh AP in the above description. *Furthermore, the invention is also applicable to mesh nodes that are not “lightweight” but rather include enough capability to not need an LWAPP or other protocol connection for a controller to function.*

Ex. 1008 ¶ 131 (emphasis added). Petitioner argues that the emphasized sentence means that the non-lightweight mesh nodes do not need a controller. Pet. 15. By contrast, Patent Owner argues that the sentence's last phrase (“for a controller to function”) indicates that the controller still functions in this embodiment. Prelim. Resp. 24–25 (citing Ex. 2001 ¶¶ 46–48, 54).

³ LWAPP stands for Lightweight Access Point Protocol, and CAPWAP stands for Control And Provisioning of Wireless Access Points. Ex. 1008 ¶¶ 26–27.

In view of Sinha’s description of the non-lightweight architecture, we agree with Patent Owner that Petitioner does not sufficiently explain why a person of ordinary skill in the art would have understood and found obvious that Sinha’s Root AP has an integrated controller. *id.* at 24–26.

The Petition’s conclusion about the non-lightweight nodes only cites Dr. Ding’s testimony as its support for its interpretation of paragraph 131. *See id.* Yet Dr. Ding merely repeats the conclusion that the non-lightweight nodes do not need a connection to the controller:

Sinha also describes (but does not illustrate) a non-lightweight architecture whereby the controller is integrated in a MAP, *eliminating the need* for such controller-to-MAP protocol connection.

Ex. 1002 ¶ 73 (citing Ex. 1008 ¶ 131) (emphasis added). We see little support for Dr. Ding’s interpretation here. *Id.* Dr. Ding provides no additional supporting evidence or technical reasoning. *Id.* Because Dr. Ding’s testimony is conclusory and unsupported, it adds little to the conclusory assertion for which it is offered to support.

Dr. Haas’s explanation of Sinha’s paragraph 131 is better supported. Ex. 2001 ¶¶ 46–48. According to Dr. Haas, paragraph 131 states that non-lightweight APs do not need to use LWAP, CAPWAP, or other protocols for controlling the APs. *Id.* ¶ 47.⁴ Dr. Haas testifies, aside from that difference, “Sinha does not disclose or suggest any modifications to the remote centralized controller 103.” *Id.* ¶¶ 47–48. This testimony is supported by Sinha’s explanation that the non-lightweight APs do not need the protocols

⁴ CAPWAP is one protocol that APs can use for exchanging messages. Ex. 1008 ¶ 27. LWAP, an earlier version of CAPWAP, is another. *Id.* ¶ 26.

“for a controller to function,” which indicates that this architecture uses a controller. Ex. 1008 ¶ 131.

We credit Dr. Haas on this issue (Ex. 2001 ¶¶ 46–48) over Dr. Ding (Ex. 1002 ¶¶ 74–78) because Dr. Haas’s testimony is supported by Sinha. We do not credit Dr. Ding’s testimony (Ex. 1002 ¶¶ 74–78) because it lacks sufficient supporting evidence and technical reasoning. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

Thus, we agree with Patent Owner that Petitioner does not show that Sinha discloses, teaches, or suggests that its non-lightweight architecture has APs with integrated controllers, as described in the Petition. *See* Prelim. Resp. 23–26.

e. Modifications to Sinha

We also agree with Patent Owner that Petitioner does not provide sufficient support for its arguments that (1) one of ordinary skill in the art would have been motivated to modify Sinha to integrate the controller in the APs and (2) the modification would have been obvious to try or would have been nothing more than an application of a known technique to a known system ready for improvement. Pet. 18–19.

i. Motivation

Petitioner’s reason that one would have been motivated to make the modification is nothing more than a restatement of the proposed change. *Id.* That is, Petitioner argues that one benefit of integrating the controller into the AP is “higher integration.” *Id.* at 18. Here, Petitioner is describing a result (higher integration) that merely restates the proposed modification (integrating the controller). *Id.* Similarly, “reduced communication complexity” is nothing more than a restatement of the other aspect of the

proposed modification: removing the communications between the controller and AP. *Id.*

Petitioner's reliance on Liu is of little help to its obviousness rationale because the cited parts of Liu at most discuss a gateway and a centralized controller. *See* Pet. 18; Ex. 1009 ¶¶ 59, 62, Fig. 1. For example, Liu explains that the gateway collects information from the MAPs then determines the optimal STA-MAP association backhaul. Ex. 1009 ¶ 59 (discussing Fig. 6). According to Figure 9, Liu's gateway communicates with the MAPs. *Id.* ¶ 62.

Petitioner does not explain how Liu teaches any benefits to the proposed integration. *See* Pet. 18–19. Nor does Liu explain how to make such a modification. Ex. 1009 ¶¶ 59, 62, Fig. 1. Generally, the Petition contains no explanation why one of ordinary skill in the art would have modified Sinha to integrate a controller in a MAP from Liu's discussion of a separate gateway that controls the MAPs. Pet. 18–19 (citing Ex. 1009 ¶¶ 59, 62, Fig. 1). That is, even if Liu teaches integrating a controller in a MAP, Petitioner does not provide a sufficient reason to look to Liu in the first place. *Id.*

We also see insufficient support for Petitioner's argument that reduced cost would have been an added benefit. *Id.* at 16–17 (citing Ex. 1002 ¶ 75). The Petition relies on Dr. Ding's testimony to support its argument:

In my opinion, a POSITA would recognize and understand that a non-lightweight architecture that integrates the centralized controller in the network's RootAP (as illustrated in Figure 1M) advantageously reduces the number of network devices and connections, thereby reducing complexity and cost. As I have illustrated above, the "one-box" RootAP with integrated central controller in the Figure 1M at right replaces the "two-box"

solution with centralized controller and separate RootAP connected through a secure tunnel in Figure 1 at left.

Ex. 1002 ¶ 75. Here, Dr. Ding provides no support for the assertion that cost or complexity would be reduced with any citations to the record. *Id.* Also, Dr. Ding does not otherwise explain how the proposed modification would cost less or be less complex. *Id.* Because Dr. Ding does not provide supporting evidence or technical reasoning, we give Dr. Ding’s testimony on this issue little weight. *See* 37 C.F.R. § 42.65(a).

Dr. Haas notes that integration is not always beneficial.

See Ex. 2001 ¶ 57. A single device with more functionality could be more complex and more expensive to produce. *Id.* Also, a separate remote centralized controller could be beneficial because it could be used to control more than one network. *See id.* Reusing the controller in this way could reduce costs. *Id.* Dr. Haas asserts that yet another benefit of a separate controller is mobility—i.e., “handling of mobile clients migrating between networks.” *Id.* (citing Ex. 1008 ¶ 128). Indeed, Sinha explains that the STAs could be mobile devices that “have the capability to be moved and still communicate.” Ex. 1008 ¶ 128. Thus, we agree with Patent Owner’s argument that integration may not always be beneficial and that Petitioner’s obviousness rationale about reducing complexity and cost is not adequately supported. *See* Prelim. Resp. 26–28.

We credit Dr. Haas on this issue (Ex. 2001 ¶ 57) over Dr. Ding (Ex. 1002 ¶ 75) because Dr. Haas’s testimony is better supported by Sinha and Dr. Ding’s testimony lacks sufficient supporting evidence and technical reasoning.

Thus, Petitioner does not adequately support its assertion that one of ordinary skill in the art would have been motivated to integrate a controller in Sinha's Root AP. *See id.*

ii. Obvious to Try and Known Technique

The Petition lacks a sufficient explanation (1) why the integration would have been obvious to try and (2) why the proposed modification would have been nothing more than an application of a known technique to a known system ready for improvement. Pet. 18–19 (citing Ex. 1002 ¶ 78). For instance, there is no explanation why the integration would have been an improvement, let alone why Sinha was ready for improvement. *Id.* Rather, Petitioner cites only the Ding Declaration for these assertions. *Id.* But Dr. Ding merely restates the assertion being supported without additional supporting evidence or technical reasoning. *Compare* Ex. 1002 ¶ 78, *with* Pet. 18–19. Thus, we give Dr. Ding's testimony on this issue little weight. *See* 37 C.F.R. § 42.65(a).

iii. Express Disclosure, Teaching, or Suggestion

Lastly, to the extent that any of Petitioner's obviousness rationales are based on the argument that Sinha expressly discloses, teaches, or suggests that its non-lightweight architecture has APs with integrated controllers, the rationale is deficient for all the reasons discussed in § II.C.3.d. *See* Prelim. Resp. 23–26.

iv. Conclusion

For the additional reasons discussed in this section, we agree with Patent Owner that Petitioner does not show that it would have been obvious to modify Sinha to create a non-lightweight architecture with APs having integrated controllers, as described in the Petition. *See id.* at 26–33. Thus,

Petitioner does not show a reasonable likelihood of prevailing in its challenges to independent claims 1 and 11 in Ground IA.

f. Claims 2, 4–7, 12, and 14–16

Claims 2, 4–7, 12, and 14–16 depend from claims 1 and 11. Petitioner asserts that claims 2, 4–7, 12, and 14–16 are unpatentable as obvious over the Sinha-Liu combination. Pet. 38–44. Petitioner’s analysis for the dependent claims does not remedy the deficiencies in its analysis for independent claims 1 and 11. *See id.* Rather, Petitioner relies on the modifications to Sinha discussed in connection with independent claims 1 and 11. *See, e.g., id.* at 40, 42, 43 (reproducing the modified-version of Sinha’s Figure 1). Because claims 2, 4–7, 12, and 14–16 incorporate the features of claims 1 and 11 and Petitioner relies on the same obviousness rationale addressed in § II.C.3 to address those features, Petitioner does not show a reasonable likelihood of prevailing in its challenge to claims 2, 4–7, 12, and 14–16 for the reasons discussed in § II.C.3.

4. Ground IB

Petitioner’s Ground IB incorporates by reference the obviousness rationale about Sinha’s non-lightweight architecture with APs having integrated controllers, with no additional analysis specific to Ground IB. *See* Pet. 48 (citing § VI.A.2(a) of the Petition including the analysis of Ground IA). Thus, for the reasons discussed in connection with Ground IA, Petitioner does not show a reasonable likelihood of prevailing in its challenge to independent claims 1 and 11—that is, Petitioner does not show that it would have been obvious to modify Sinha to create a non-lightweight architecture with APs having integrated controllers, as described in the Petition. *See supra* § II.C.3 (analyzing Ground IA).

D. Obviousness over Sinha, Liu, and Handforth

1. Handforth

Handforth purports to improve meshed backhaul networks by using redundant, aggregated links. Ex. 1006, Abstract. The aggregate bandwidth of these links is advertised to let network-level routing treat them as a single link. *Id.* The system can also use different physical links within the same logical link. *Id.* According to Handforth, this improves the quality of service because different types of traffic do not compete for the same bandwidth. *Id.*

2. Ground II

Claims 8–10 and 17–19 depend, directly or indirectly, from independent claims 1 and 11. *See* Ex. 1001, 31:5–67. In the table of grounds and the heading to the section for Ground II, Petitioner asserts that claims 1–19 are rendered obvious by Sinha in combination with Liu and Handforth. Pet. 2, 53. Yet Petitioner provides no additional analysis about how Handforth applies to claims 1–7 and 11–16. *Id.* at 53. Rather, Petitioner simply explains that “[claims] 1-7 and 11-16 are rendered obvious by Sinha in combination with Liu and Handforth for the reasons discussed under VI.B.” *Id.*

We agree with Patent Owner that Petitioner does not (1) articulate any reason to combine Handforth with Sinha and Liu for independent claims 1 and 11 or (2) rely on Handforth for any disclosure of any claim element in the independent claims. Prelim. Resp. 47. For at least these reasons, Petitioner does not show a reasonable likelihood of prevailing in Ground II.

To the extent that Petitioner intends to challenge only claims 8–10 and 17–19 under the Sinha-Liu-Handforth combination, and the reasoning from its analysis of claims 1–7 and 11–16 in Ground IB is unchanged by the addition of Handforth, Petitioner does not show a reasonable likelihood of

prevailing in Ground II for the reasons explained in § II.C.3 of this decision. *See* Pet. 53–59. In particular, Petitioner does not rely on Handforth to remedy the deficiency of its challenge under Ground IB. *See id.* at 54.

Rather, Petitioner merely argues that “Handforth teaches using different wireless technologies to form redundant wireless channels linking nodes of a wireless mesh network,” “carrying different types of backhaul traffic over different links,” “confining the differences in link technologies locally at the end points of such links,” among other teachings relating to handling different wireless technologies. *Id.* at 54–55. For this additional reason, Petitioner does not show a reasonable likelihood of prevailing in Ground II.

E. Obviousness over Gatewood and Sinha

Petitioner asserts that claims 1, 3–6, 11, and 13–16 are unpatentable as obvious over Gatewood and Sinha. *Id.* at 59–87.

1. Gatewood

According to Gatewood, wireless local area networks (WLANs) use backhaul links to transport its communications to other networks such as the Internet or other external networks. Ex. 1005, 1:30–33. But a wireless backhaul link may have transmission issues causing frequent downtimes. *Id.* at 1:33–35. So Gatewood uses a selection process to select a first backhaul link and another as its backup. *Id.* at 4:59–61. The WLAN access node may make this selection by comparing signal strength and uptime of a set of available links. *Id.* at 3:5–7, 20–22.

2. Claims 1 and 11

a. Forward Wireless Communication and Backhaul Communication

Claims 1 and 11 recite “establishing a forward wireless communication *with a second mesh point*” and “establishing a backhaul communication, separate from the forward wireless communication, *with the*

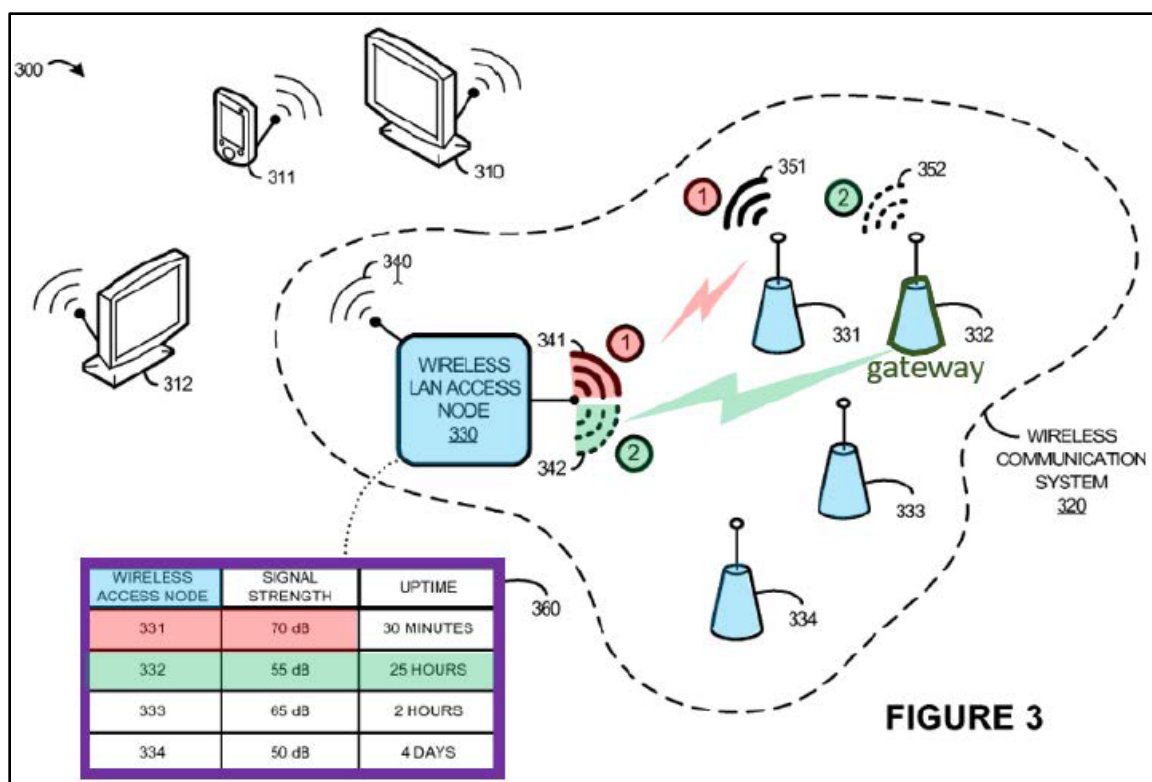
second mesh point.” Ex. 1001, 31:9–13 (claim 1), 32:6–10 (claim 11) (emphasis added). That is, claims 1 and 11 recite that both the forward wireless communication and the backhaul communication are established with the same mesh point. *See id.* Both parties agree with this interpretation. *See* Pet. 70–71; Prelim. Resp. 62.

In the Gatewood-Sinha combination, Petitioner argues that Gatewood discloses or renders obvious the claimed forward wireless communication and backhaul communication. *See* Pet. 65–72. For the reasons that follow, we agree with Patent Owner that Petitioner does not provide adequate evidence and explanation on this issue to show a reasonable likelihood that it would prevail in its challenges to claims 1 and 11. *See* Prelim. Resp. 62–70.

i. Does Gatewood disclose the recited forward wireless communication and backhaul communication?

(a) Gatewood’s Figure 3

To address the recited forward wireless communication and backhaul communication, Petitioner relies, in part, on the embodiment shown in Gatewood’s Figure 3, reproduced below with Petitioner’s annotations. Pet. 70.



Petitioner argues that MAP 332 corresponds to the claimed “second mesh point.” *Id.* Gatewood explains that links 341 and 342 are the first and second wireless backhaul links. Ex. 1005, 4:49–53, 5:37–46. Petitioner highlights the claimed backhaul communication in red (labeled “1” in the original figure), and the claimed forward communication in green (labeled “2”). *See* Pet. 70.⁵

But, unlike the claimed “second mesh point,” Gatewood’s Figure 3 does not show that both the forward wireless communication and the backhaul communication are established with the same mesh point. *See* Ex. 1005, Fig. 3. That is, under the Petition’s mapping, node 332 corresponds to the claimed second mesh point, and link 341 corresponds to the claimed backhaul communication. *See* Pet. 70. Yet link 341 connects

⁵ Petitioner adds red and green shapes from WLAN node 330 to MAPs 331 and 332. *Compare* Pet. 70, with Ex. 1005, Fig. 3.

node 330 to node 331—not node 332. *See* Ex. 1005, Fig. 3. Node 332 is connected to node 330 via link 342. *See id.*

In fact, link 342 is actually a backup for link 341. *Id.* at 6:33–47. As a backup, link 342 would provide a parallel connection from node 330 to an external network. *See id.* at 3:58–66. Link 342 may be used when link 341 is unavailable, underperforming, or does not meet other performance criteria. *Id.* at 6:33–42. For example, Figure 3 shows the performance data in the lower left-hand table, which represents data structure 360. Pet. 70. Data structure 360 stores signal strengths of 70 dB, 55 dB, 65 dB, and 50 dB for wireless access nodes 331, 332, 333, and 334. Ex. 1005, Fig. 3. Because node 331 has the highest signal strength in this example, WLAN access node 330 selects WLAN access node 331 as the first wireless backhaul link (341). *Id.* at 4:50–52. Also, data structure 360 stores uptimes of 30 minutes, 25 hours, 2 hours, and 4 days for wireless access nodes 331, 332, 333, and 334. *Id.*, Fig. 3. According to Gatewood, WLAN access node 330 selects a second wireless backhaul link as a backup based on its signal strength and uptime. *Id.* at 4:59–61.

Thus, we agree with Patent Owner that Gatewood’s Figure 3 does not disclose that the links that Petitioner maps to the forward wireless communication and the backhaul communication are established with same mesh point, as required by the claim. Prelim. Resp. 63.

(b) Multi-hop Backhaul Communication Path

Apart from Gatewood’s Figure 3, Petitioner relies on Dr. Ding’s testimony about a multi-hop backhaul communication path. Pet. 70–71. In Petitioner’s view, this multi-hop path meets the claimed forward wireless communication and the backhaul communication:

The first backhaul link 341 (claimed backhaul communication) selected by MAP.330 (claimed first mesh point) is part of a 2-hop backhaul communication path (MAP.330-to-MAP.331-to-MAP.332) connecting MAP.330 (claimed first mesh point) and the gateway/MAP.332 (claimed second mesh point), as claimed.

Id. (citing Ex. 1002 ¶ 179). Figure 3 does not show these multi-hop connections. *See* Ex. 1005, Fig. 3. Rather, Petitioner relies only on the Ding Declaration for this argument. *See* Pet. 70–71 (citing Ex. 1002 ¶¶ 179–182).

Dr. Ding’s testimony, though, is not consistent with Gatewood’s explanation that link 342 is link 341’s backup. *See* Ex. 1005, 4:59–61, 6:33–47. Specifically, Dr. Ding asserts that MAP 332 provides “access to the Internet.” *Id.* (citing Ex. 1005, 3:58–66). Yet Gatewood explains that nodes 331–334 are “communicatively coupled to *further networks or communication links*”—not in a multi-hop connection involving MAPs 330, 331, and 332. *See* Ex. 1005, 3:58–66 (emphasis added). Gatewood’s Figure 3 shows that links 341 and 342 connect to MAPs 331 and 332 in parallel. *Id.*, Fig. 3. And Gatewood states that each MAP has its own connection to the Internet. *Id.* at 3:58–62. Thus, there is little support for Dr. Ding’s assertion that Gatewood teaches such a multi-hop connection that includes MAPs 331 and 332. Ex. 1002 ¶¶ 179–182.

On this issue, we credit Dr. Haas over Dr. Ding because Dr. Haas’s testimony is better supported by Gatewood. *See* Ex. 2001 ¶ 84. According to Dr. Haas, “each of the WLAN access nodes 331-334 has connections to other networks such as the Internet, thus there is no disclosure or need for two-hop communication in Gatewood’s network.” *Id.* (citing Ex. 1005, 3:58–4:3). Dr. Haas asserts that “no hops are needed between them for the client data to get to the other networks, e.g., the Internet.” *Id.* We agree with Dr. Haas because Figure 3 shows two separate wireless backhaul links, as

indicated by the labels (#1 and #2) and the bottom-left table. Ex. 1005, Fig. 3. Also, Dr. Haas’s testimony is consistent with Gatewood’s description of link 342 as a backup. *See, e.g., id.* at 4:59–61, 6:33–47.

Thus, Petitioner does not sufficiently support its argument that Gatewood discloses “establishing a forward wireless communication *with a second mesh point*” and “establishing a backhaul communication, separate from the forward wireless communication, *with the second mesh point*,” as recited in claims 1 and 11.

ii. Does Gatewood render obvious the forward wireless communication and backhaul communication?

As discussed above, Petitioner does not show that Gatewood discloses the recited forward wireless communications and backhaul communications. For the reasons that follow, Petitioner also does not sufficiently support its argument that Gatewood renders obvious those communications. Pet. 68–72.

(a) Proposed Modification to Gatewood’s Figure 3

According to Petitioner, “Gatewood teaches that there are multiple candidate backhaul links between any two MAPs—such as between MAP.330 and MAP.332.” *Id.* at 71 (citing Ex. 1005, 10:23–31); *see also id.* at 60–61 (citing Ex. 1005, 3:58–4:3). Gatewood’s Figure 3 does not show that those links are established with the same mesh point. Ex. 1005, Fig. 3. So, as best understood, Petitioner’s obviousness rationale here must involve modifying the embodiment shown in Figure 3 to create a “2-hop backhaul communication path (MAP.330-to-MAP.331-to-MAP.332) connecting MAP.330 (claimed first mesh point) and the gateway/MAP.332 (claimed second mesh point).” Pet. 70–71.

To support this rationale, Petitioner cites Gatewood’s discussion of additional wireless links in Figure 1:

Although one main wireless link for each of wireless links 140-142 and 151-153 is shown in FIG. 1, it should be understood that wireless links 140-142 and 151-153 are merely illustrative to show communication modes or wireless access pathways for user devices 110-112 and associated backhaul. In other examples, further wireless links can be shown, with portions of the further wireless links shared and used for different communication sessions or different content types, among other configurations.

Ex. 1005, 10:23–31, *cited in* Pet. 71. In quoting this passage, Petitioner adds references to Figure 3 and its own emphasis:

Although ***one main*** wireless link for each of wireless links [] is shown in FIG. 1 [and in FIG. 3], it should be understood that [they] are merely illustrative [and] ***further*** wireless links can be shown

Pet. 71 (with Petitioner’s emphasis). But Petitioner does not explain why Gatewood’s description of Figure 1 also applies to Figure 3. *Id.* Rather, Petitioner simply provides this modified quotation to support its argument about multiple candidate backhaul links between any two MAPs. *Id.*

We see little support for Petitioner’s characterization of the features described in the quotation—even assuming the quotation also pertains to Figure 3. *See id.* Gatewood’s Figure 1 is reproduced below. Ex. 1005, 10:23–31, Fig. 1.

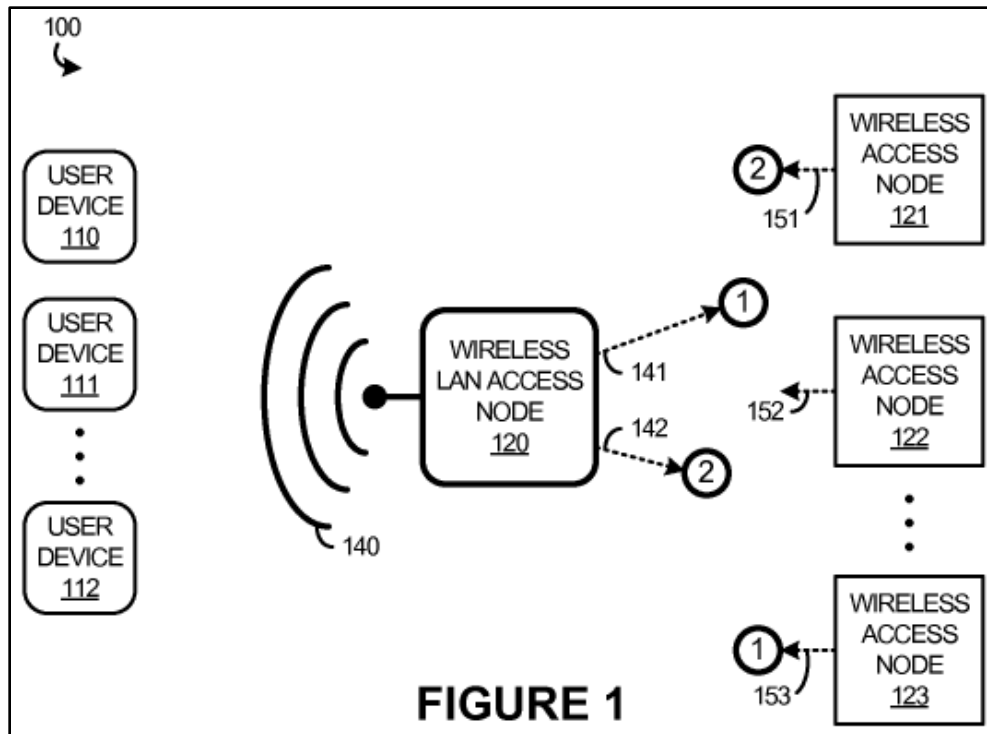


Figure 1 shows WLAN access node 120 providing WLAN 140 and associated backhaul to user devices 110–112. *Id.* at 9:28–35. Wireless access nodes 121–123 include wireless routers, bridges, and access points with wireless links 140–142 and 151–153. *Id.* at 9:45–49. The figure shows only one main access link for each of wireless links 140–142 and 151–153. *Id.* at 10:23–27.

Patent Owner argues that Gatewood’s Figure 1 does not disclose multiple links between the same two access nodes. Prelim. Resp. 67 (citing Ex. 2001 ¶¶ 86–87). We agree. Although Gatewood explains that, in other examples, there may be additional wireless links, neither Figure 1 nor these other examples show the specific configuration that Petitioner relies upon in its obviousness rationale. *See* Ex. 1005, 10:28–31. Rather, Dr. Ding’s testimony is the sole basis for Petitioner’s analysis of Gatewood’s additional links. Ex. 1002 ¶¶ 179–182.

On the issue of Gatewood’s additional links, we credit Dr. Haas (Ex. 2001 ¶¶ 86–87) over Dr. Ding (Ex. 1002 ¶¶ 179–182) because Dr. Haas’s testimony is better supported by Gatewood. According to Dr. Haas, “Gatewood does not disclose that these ‘further wireless links’ are between the WLAN access node and the same other wireless nodes; i.e., duplication of the labeled links.” Ex. 2001 ¶ 86. Dr. Haas explains that, even if Gatewood disclosed this and the links were indeed for backhaul, “there is no teaching or suggestion that they would be alternative backhaul links such that if one failed, Gatewood’s system would choose another link to the same node as the backup wireless backhaul.” *Id.* ¶ 87. Dr. Ding’s testimony, on the other hand, is not consistent with Gatewood’s discussion of the backup wireless backhaul. Ex. 1002 ¶¶ 179–182.

Overall, we see little support for Petitioner’s modification to Gatewood’s Figure 3 or interpretation of Figure 1. *See* Pet. 68–72. Rather, Petitioner’s obviousness rationale appears to be based on impermissible hindsight gleaned entirely from the challenged patent’s specification. *See id.* And, as Dr. Haas’s testimony indicates (Ex. 2001 ¶¶ 86–87), Petitioner’s proposal to modify Figure 3 to create a link that is dependent on another (e.g., the multi-hop connection) would render Gatewood’s MAPs 331 and 332 unsuitable for their intended purpose: providing redundancy when needed. *See* Pet. 68–72.

(b) Combination with Sinha

Although Petitioner asserts that Gatewood renders obvious the recited forward wireless communication and backhaul communication (Pet. 70), Petitioner attempts to fold Sinha into its analysis. *Id.* at 71. According to Petitioner, “Establishing multiple redundant backhaul links between any two MAPs was in fact well-known and expressly taught in Sinha.” *Id.* (citing

Ex. 1008 ¶ 103; Ex. 1006, 4:54–63). Yet Petitioner provides no discussion of why or how these teachings would have been incorporated in Gatewood. *See id.*

Apart from this deficiency, Patent Owner argues that Sinha discloses multiple paths to a controller, and Gatewood does not need the multi-hop path that Petitioner describes. Prelim. Resp. 67. We agree.

On this issue, we credit Dr. Haas (Ex. 2001 ¶ 88) over Dr. Ding (Ex. 1002 ¶ 108) because Dr. Haas’s testimony better aligns with Gatewood. *See supra* § II.C (discussing Sinha). For example, Gatewood’s teachings about backup nodes (Ex. 1005, 4:59–61, 6:33–47), discussed above, support Dr. Haas’s testimony that “Gatewood provides redundancy through the deployment of multiple wireless nodes 331–334,” and “[a]dditional redundancy is not needed when a single link fails, because WLAN access node 330 can choose a link to a different wireless node for backhaul.” *See* Ex. 2001 ¶ 88. On the other hand, Dr. Ding’s testimony (Ex. 1002 ¶ 108) does not give sufficient weight to Gatewood’s disclosure that nodes 331–334 are “communicatively coupled to further networks,” not in a multi-hop arrangement that links those MAPs, as described by Petitioner. *See* Ex. 1005, 3:58–66.

In sum, Petitioner does not provide a sufficient rationale to show that Gatewood renders obvious “establishing a forward wireless communication *with a second mesh point*” and “establishing a backhaul communication, separate from the forward wireless communication, *with the second mesh point.*” *See* Pet. 71.

(c) Prosecution History

Lastly, Petitioner argues that the Examiner relied on the same features from Gatewood during prosecution, and Patent Owner did not specifically

rebut the Examiner's findings. *See id.* at 72. Even if true, it is unclear how this is helpful to Petitioner's position because the Examiner allowed the claims after considering Gatewood. *See id.* at 87–88. It is possible that the Examiner reconsidered that analysis at the time of allowance. Or the Examiner may simply have erred when considering Gatewood in the original rejection. Regardless, the record does not sufficiently support Petitioner's argument that Patent Owner agreed with the Examiner's analysis at the time it was made, or even that the Examiner did when issuing the Notice of Allowance.

iii. Conclusion: Forward Wireless and Backhaul Communication

Thus, Petitioner does not sufficient support its argument that Gatewood renders obvious “establishing a forward wireless communication *with a second mesh point*” and “establishing a backhaul communication, separate from the forward wireless communication, *with the second mesh point,*” as recited in claims 1 and 11. For at least this reason, Petitioner does not show a reasonable likelihood of prevailing in its challenge to independent claims 1 and 11.

b. Constructing a List of Backhaul Candidates

Claims 1 and 11 further recite additional limitations related to the second mesh point:

constructing a list of backhaul candidates, each backhaul candidate having a score indicative of an estimated quality of a potential link between the first mesh point and *the second mesh point*;

Ex. 1001, 31:23–26 (emphasis added).

As discussed in § II.E.2.a, Petitioner does not sufficiently support its argument that Gatewood discloses or renders obvious the second mesh point having the recited forward wireless communication and backhaul

communication established with it. Because the rest of claims 1 and 11 recite additional limitations related to the second mesh point, Petitioner does not sufficiently show that Gatewood discloses or renders obvious the construction of a list of backhaul candidates with a potential link between the first mesh point and the second mesh point, as recited in the rest of the claim. *See supra* § II.E.2.a.

Apart from that deficiency, Petitioner does not sufficiently support its argument that Gatewood, alone or in combination with Sinha, renders obvious the recited list for additional reasons. In particular, Petitioner argues that Gatewood’s data structure 360 stores links that are part of “potential end-to-end backhaul communication path between MAP.330 (claimed first mesh point) and MAP.332 (claimed second mesh point and gateway).” Pet. 75 (citing Ex. 1002 ¶¶ 192–193). There is little support for this in Gatewood’s disclosed embodiments.

For example, Gatewood’s data structure 360 is shown in Figure 3, excerpted below. Ex. 1005, Fig. 3.

WIRELESS ACCESS NODE	SIGNAL STRENGTH	UPTIME
331	70 dB	30 MINUTES
332	55 dB	25 HOURS
333	65 dB	2 HOURS
334	50 dB	4 DAYS

The table above shows that data structure 360 stores signal strengths of 70 dB, 55 dB, 65 dB, and 50 dB for wireless access nodes 331, 332, 333, and 334. *Id.* WLAN access node 330 detects these signal strengths. *Id.* at 4:9–10. Also, data structure 360 stores the corresponding uptimes: 30 minutes, 25 hours, 2 hours, and 4 days. *Id.*, Fig. 3. According to Gatewood, WLAN

access node 330 considers these signal strengths and uptime values when selecting the backup backhaul link. *Id.* at 4:59–61.

Petitioner primarily cites to Dr. Ding’s testimony to support its obviousness analysis. Pet. 75 (citing Ex. 1002 ¶¶ 192–193). But Dr. Ding’s testimony does not give sufficient weight to Gatewood’s disclosure that the signal strengths in data structure 360 reflect communication links between WLAN access node 330 and each WLAN access node 331–334, which is different from the multi-hop backhaul path described by Petitioner. Ex. 1005, 4:9–10. Also, Dr. Ding does not give sufficient weight to Gatewood’s disclosed purpose for data structure 360: selecting an alternative link. *See id.* at 4:59–61, 6:33–47.

Rather, we agree with Patent Owner’s argument that Gatewood’s “weighting calculation does not indicate an estimated quality of a potential link between the wireless access node and ‘the second mesh point’ as required by the claim.” Prelim. Resp. 69.

In reaching this conclusion, we credit Dr. Haas (Ex. 2001 ¶¶ 92, 94) over Dr. Ding (Ex. 1002 ¶¶ 196–198) because Dr. Haas’s testimony is supported by Gatewood. Unlike Dr. Ding’s testimony, Dr. Haas’s explanation why a person of ordinary skill in the art would not have modified Gatewood is supported by Gatewood’s discussion of how the nodes are connected to the Internet:

[A] POSITA would have not modified Gatewood to use multiple routes because of the explicit disclosure in Gatewood that each of wireless nodes 331-334 have their own connections to other networks such as the Internet, and therefore WLAN access node 330 has multiple direct links to various gateways and does not need to take multiple routes to a single gateway as Petitioner implies.

Ex. 2001 ¶ 92 (citing Ex. 1005, 3:58–4:3). Dr. Haas notes that Gatewood already contains a mechanism to switch routes in the event of failure. *Id.* Dr. Haas’s testimony here is consistent with Gatewood’s explanation that the second wireless backhaul link is a backup for the first (Ex. 1005, 4:59–61, 6:33–47) and nodes 331–334 are “communicatively coupled to further networks” (*id.* at 3:58–66).

Petitioner’s reliance on Sinha does not remedy this deficiency. Pet. 81. Petitioner argues that “POSITA would have been motivated to implement Sinha’s teachings in Gatewood’s network to further improve it, notably to provide the additional capability to handle multiple classes of traffic (important for multimedia applications) and to rapidly switch routes in the event of failure.” *Id.* at 81–82.

Dr. Haas explains why Gatewood’s architecture would not need to change to handle different classes of traffic:

[I]f a communication (from WLAN access node 330) were to use a multi-hop path to a gateway node 333 and that path includes first another gateway node 332, there is no need for the extra hop from node 332 to node 333, when the communication can make it to the other network (e.g., the Internet) using already-reached gateway node 332.

Ex. 2001 ¶ 92. For the reasons discussed in § II.E.2.a, we credit Dr. Haas (*id.*) over Dr. Ding (Ex. 1002 ¶ 202) on this issue. As discussed above, creating a link that is dependent on another, as in Petitioner’s proposed multi-hop connection, would render Gatewood’s MAPs 331 and 332 unsuitable for their intended purpose to provide redundancy when needed. *See supra* § II.E.2.a. Petitioner does not provide a sufficient reason to modify Gatewood to provide for the multi-hop scheme that is the basis for

its obviousness rationale under the Gatewood-Sinha combination.

See Pet. 78

Thus, Petitioner does not sufficiently support its argument that Gatewood renders obvious the limitations to a list of backhaul candidates, as recited in claims 1 and 11.

For this additional reason, Petitioner does not show a reasonable likelihood of prevailing in its challenge to independent claims 1 and 11.

3. *Dependent Claims*

Claims 3–6 and 13–16 depend from claims 1 and 11. Petitioner asserts that claims 3–6 and 13–16 are unpatentable as obvious over Gatewood and Sinha. *Id.* at 82–87. Petitioner’s analysis for the dependent claims does not remedy the deficiencies in its analysis for independent claims 1 and 11. *See id.* Because claims 3–6 and 13–16 incorporate the features of claims 1 and 11, Petitioner does not show a reasonable likelihood of prevailing in its challenge to claims 3–6 and 13–16 for the reasons discussed in § II.E.2.

III. CONCLUSION

Petitioner does not show a reasonable likelihood of prevailing on the grounds for any claims. Thus, we do not institute an *inter partes* review. *See* 35 U.S.C. § 314(a).

IV. ORDER

It is

ORDERED that the Petition is *denied*.

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Patent 10,278,179

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