

Filed on behalf of: Netgear, Inc.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TP-LINK CORPORATION LIMITED,
Petitioner,

v.

NETGEAR, INC.,
Patent Owner.

Case IPR2023-01429
Patent 10,278,179

**DECLARATION OF ZYGMUNT J. HAAS, PH.D.
IN SUPPORT OF PATENT OWNER'S
PRELIMINARY RESPONSE**

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I. Introduction and Qualifications

1. I have been retained by Netgear, Inc. (“Patent Owner”) to provide my opinion concerning the validity of U.S. Patent No. 10,278,179 (Ex. 1001).

2. I am a Professor and Distinguished Chair in Computer Science at the University of Texas in Dallas. I am also a Professor Emeritus at the School of Electrical and Computer Engineering at Cornell University. In addition, I have provided technical consulting services on intellectual property matters, during which I have written expert reports and provided deposition and trial testimony involving, among others, wireless communication technologies.

3. My academic credentials include a Bachelor of Science Degree in Electrical Engineering, summa cum laude, from Technion (IIT), Israel, in 1979 and a Master of Science Degree in Electrical Engineering, summa cum laude, from Tel Aviv University, Israel, in 1985. I subsequently authored the thesis titled “Packet Switching in Fiber-Optic Networks” as part of earning my Ph.D. in Electrical Engineering from Stanford University in 1988.

4. I am being compensated at the rate of \$500 with reimbursement for actual expenses for my work related to this matter. My compensation is not dependent on, and in no way affects, the substance of my statements in this Declaration.

5. I have worked or consulted for about 35 years in the fields of Electrical Engineering and Computer Science. My professional focus has been, among a number of fields, on communication and networking systems, with an emphasis on wireless communication networks. I have authored and co-authored numerous technical papers and book chapters related to wireless communication networks. I hold over twenty patents in the fields of high-speed networking, wireless networks, and optical communication/switching. My employment history following my graduation from Stanford University began at the Network Research Department of AT&T Bell Laboratories in 1988. At AT&T Bell Laboratories, I pursued research on wireless communications, mobility management, fast protocols, optical networks, and optical switching. During my tenure at AT&T, I also worked for the AT&T Wireless Center of Excellence, where I investigated various aspects of wireless and mobile networks.

6. In 1995, I joined the faculty of the School of Electrical & Computer Engineering at Cornell University, and in time I was promoted to a Full Tenured Professor. At Cornell, I headed the Wireless Networks Lab, a research group with extensive contributions in the area of wireless communication systems and networks. In 2013, I retired from Cornell University with the title of Emeritus Professor, and I joined the Computer Science Department at the University of Texas at Dallas with the title of Professor and Distinguished Chair in Computer

Science. At Cornell University and at the University of Texas, I have taught dozens of courses related to computer networking and wireless communications. I have also served on various committees for the benefit of the scientific community.

7. I am a member of a number of professional societies, including the Institute of Electrical and Electronic Engineers (IEEE) and the Association for Computing Machinery (ACM). In 2007, I was elevated to an IEEE Fellow, and in 2022, I was elevated to an ACM Fellow, both well-known distinctions. For example, the total number of IEEE Fellows which are selected in any given year does not exceed 0.1% of the total number of voting members of IEEE. With respect to the ACM Fellow grade, ACM states that “ACM’s most prestigious member grade recognizes the top 1% of ACM members for their outstanding accomplishments in computing and information technology and/or outstanding service to ACM and the larger computing community.” See <https://awards.acm.org/fellows>.

8. I have delivered numerous tutorials at major IEEE and ACM conferences. I served as editor of several publications including the IEEE Transactions on Networking, the IEEE Transactions on Wireless Communications, the IEEE Communications Magazine, the Springer “Wireless Networks” journal, the Elsevier “Ad Hoc Networks” journal, the “Journal of

High Speed Networks,” and the Wiley “Wireless Communications and Mobile Computing” journal. I was also a guest editor of IEEE Journal on Selected Areas in Communications for the issues on “Gigabit Networks,” “Mobile Computing Networks,” and “Ad-Hoc Networks.” Finally, I served as the Chair of the IEEE Technical Committee on Personal Communications (TCPC), today known as Wireless Communications Technical Committee (WTC).

9. I have received several awards in the field of wireless communications and network technology. In 2016, I received the IEEE ComSoc AHSN Recognition Award “for outstanding contributions to securing ad hoc and sensor networks”. In 2012, I received the IEEE ComSoc WTC Recognition Award, which recognizes individuals “for outstanding technical contributions in the field for their service to the scientific and engineering communities.” In 2021, I received the “Best Paper Award” for coauthoring the paper “Engineering a Network in the Sky” from the 35th International Conference on Information Networking, (ICOIN21). In 2012, I received the “Best Paper Award for co-authoring “Collaborating with Correlation for Energy Efficient WSN” directed at Wireless Sensor Networking. I previously received the “Best Paper Award” for co-authoring “Optimal Resource Allocation for UWB Wireless Ad Hoc Networks” directed at personal indoor and mobile radio communications. Finally, in 2003, I received the “Highly Commended Paper Award” for co-authoring

“Performance Evaluation of the Modified IEEE 802.11 MAC for Multi-Channel Multi-Hop Ad Hoc Network,” directed at advanced information networking and applications.

10. Additional information regarding my education, technical experience and publications, including a list of the U.S. patents of which I am an inventor/coinventor, is included in my *Curriculum Vitae*, which I understand is attached at Exhibit 2002.

II. Summary Of Materials Reviewed And Considered

11. The opinions contained in this Declaration are based on the documents that I reviewed, my knowledge, and professional judgment. In forming the opinions expressed in this Declaration, while drawing on my experience in the field of wireless communications, I reviewed the following documents¹:

Ex.	Description
1001	United States Patent No. 10,278,179 (“the ’179 patent”)
1002	Declaration of Dr. Zhi Ding (“Ding Declaration”)
1004	File History for the ’179 patent (“’179 FH”)
1005	U.S. Patent 9,001,767 (“Gatewood”)
1006	U.S. Patent 7,366,120 (“Handforth”)
1008	U.S. Patent Application Publication No. 2008/0304485 (“Sinha”)

¹ The table of the Exhibits and Exhibit numbers were supplied to me by Counsel.

Ex.	Description
1009	U.S. Patent Application Publication No. 2010/0322141 (“Liu”)
1011	U.S. Patent Application Publication No. 2016/0192203 (“Gokturk”)
1012	U.S. Patent Application Publication No. 2017/0238189 (“Nolan”)
1014	Microsoft Computer Dictionary, 5 th Edition (2002)
1017	Amended Joint Chart of Agreed and Disputed Claim Terms for Construction (ITC)
1018	Complainant Netgear’s Opening Claim Construction Brief (ITC)
1019	TP-Link’s Initial Claim Construction Brief (ITC)
1020	U.S. Patent Application Publication 2010/0260146 (“Lu”)
2004	TP-Link’s Corrected Responsive Claim Construction Brief (ITC)
2005	Order Construing Certain Claim Terms (ITC)

12. My opinions are additionally guided by my appreciation of how a person of ordinary skill in the art (“POSITA”) would have understood the claims of the ’179 patent at the time of the invention, which I have been asked to assume is November 10, 2015.²

² I note that my opinions in this declaration would not change if the date of the invention were May 13, 2016 (the filing date of U.S. Provisional 62/336,503) or October 6, 2016 (the filing date of the ’179 patent).

III. UNDERSTANDING OF LEGAL STANDARDS

13. I am not an attorney, and in this Declaration, I do not opine on matters of law. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my analysis and opinions. My understanding of these principles is set forth below.

14. I have been informed by Counsel that the validity analysis is a two-step process. First, the patent claims are construed to ascertain their proper scope. Second, the construed claims are compared to the identified prior art to determine if the claims are valid over the prior art.

A. Claim construction

15. I have been informed by Counsel that the claims of a patent define the limits of the patentee's exclusive rights. I have been informed by Counsel that to determine the scope of the claimed invention, courts typically construe claim terms, the meaning of which the parties may dispute. I have been informed by Counsel that claim terms should generally be given their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of filing of the patent application, after reading the patent and its prosecution history. I also have been informed by Counsel that a basic tenet of claim construction presumes that different words in a claim have different meanings, unless there is evidence to the contrary.

16. I have been informed by Counsel that claims must be construed in light of, and consistent with, the intrinsic evidence. In this context, I have been informed by Counsel that intrinsic evidence includes the claims themselves, the written disclosure in the specification, and the patent's prosecution history, including prior art that was considered by the United States Patent and Trademark Office ("USPTO"). I have been informed by Counsel that the specification is always highly relevant to the claim construction analysis and often is the single best guide to the meaning of a disputed term. I have been informed by Counsel that extrinsic evidence may also be considered when construing claims and may include, for example, technical dictionaries, technical publications and books, treatises, and expert testimony.

B. Obviousness

17. I have been informed by Counsel that patent claims can be deemed invalid if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the pertinent art. While such conclusions are often based on more than one piece of prior art, only one is required. It is not sufficient that a collection of prior art references merely recites the various elements of a challenged patent claim. Rather, as I have been informed by Counsel, the prior art must present the elements in a manner that is

consistent with their arrangement or use in the challenged claims. I have been informed by Counsel that obviousness cannot be based on the hindsight combination of components selectively culled from the prior art.

18. I have been informed by Counsel that a person having ordinary skill in the art (i.e., a POSITA) is a hypothetical person who is presumed to have known the relevant art at the time the invention was made. I have been informed by Counsel that the condition “at the time the invention was made” is imposed to rule out impermissible hindsight. I also have been informed by Counsel that an expert is to analyze the prior art from the perspective of a person of ordinary skill in the art at the time the invention was made, and not simply to provide his/her own personal conclusions.

19. I also have been informed by Counsel that an obviousness determination includes several factual inquiries, including (1) determining the scope and content of the prior art; (2) ascertaining the differences between the claimed invention and the prior art; (3) resolving the level of ordinary skill in the pertinent art; and (4) taking into consideration any objective indicia of nonobviousness.

20. I have been informed by Counsel that obviousness must be determined as of the date of the invention (i.e., the effective filing date or priority date of the patent). Thus, in considering the reason or motivation to combine

references, it is essential to avoid using hindsight. For example, the problem examined when considering obviousness is the general problem that confronted the inventor before the invention was made, not the specific problem solved by the invention. Defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to obviousness. Further, an overly narrow statement of the problem can represent a form of hindsight, because often the inventive contribution lies in defining the problem in a new revelatory way. Similarly, an assertion that a person of ordinary skill could combine the references, rather than that they would have been motivated to do so, is an impermissible form of hindsight. Moreover, knowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references to reach the particular claimed invention.

21. I have been informed by Counsel that a motivation to solve a problem (or issue) is not the same as a motivation to have combined references. I have been informed by Counsel that whether a skilled artisan would be motivated to make a combination includes whether he/she would select particular references in order to combine their elements.

22. I have been informed by Counsel that the analysis of the motivation to combine should be explicit. Additionally, it must include articulated reasoning with rational underpinnings to support the conclusion of obviousness. Providing a

full explanation of the motivation to combine the references and the reasonable expectation of success is a necessary component of the obviousness inquiry, as inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. However, conclusory statements fail to adequately explain why a person of ordinary skill would have a motivation to combine the potential prior art references.

23. I have been informed by Counsel that common sense, common wisdom, and common knowledge may be used to support a motivation to combine, so long as the use of common sense in the analysis is explained with sufficient reasoning. But, common sense can only be used to supply a limitation missing from the prior art where the technology is unusually simple and straightforward.

24. I also have been informed by Counsel that evidence suggesting reasons to combine cannot be viewed apart from evidence suggesting reasons not to combine. In analyzing motivation, both advantages and disadvantages must be considered. Teaching away, for example, is a statement in the prior art that either (i) discourages one from following the path of the claimed invention, or (ii) encourages one to follow a path that diverges from the path of the claimed invention. The concept of teaching away bears directly on whether there was a

reason to combine prior art. Known disadvantages in prior art technology or devices which would naturally discourage a search for new inventions may also be taken into account in determining obviousness.

IV. Level of Ordinary Skill in the Art

25. For the '179 patent, a person of ordinary skill in the art ("POSITA") would have 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 data communication, wireless communication, or wireless networking systems.

V. Overview of the '179 Patent

26. The '179 patent relates to wireless mesh networks. In some wireless networks, a single access point (AP) might not be able to provide coverage for an entire indoor area of a large house or office. '179 patent, 1:48-50. As the '179 patent discloses, one way to provide wireless coverage over a large indoor area is to "us[e] a multitude of smaller APs that are deployed in the environment in a scattered, distributed manner." '179 patent, 2:3-6. "These smaller APs form a wireless mesh network, and therefore are also called 'mesh points.'" '179 patent, 2:6-8.

27. The '179 patent describes "many challenges associated with implementing these wireless mesh networks, especially in a home environment

where a layman user may be involved in installing and configuring these mesh points.” ’179 patent, 2:13-16. These problems included sub-optimal range extender placement and poor coordination between the range extenders and the main AP. ’179 patent, 3:51-60. Extenders “may not use the best band(s) to connect to the rest of the mesh network” or “may not use the best band to forward the traffic when extender is connected to two or more bands on the main AP.” ’179 patent, 4:6-10.

28. To address the issues with existing mesh networks, ’179 patent discloses “techniques to provide automated mesh point survey and guided installation” as well as “rate estimation, roaming, and dedicated backhaul link implementation in such wireless mesh network.” ’179 patent, 4:12-18. The ’179 patent further discloses “a network control system” that “can decide, for example, with which mesh point each client should associate, when a client should roam, which topology the network should be using, with which band should the client associate, which band should be used for traffic forwarding, and where to install a new mesh point.” ’179 patent, 4:26-35.

29. Figure 19 of the ’179 patent, reproduced below, “illustrate[s] an example diagram showing a backhaul link established between two mesh points (e.g., in the mesh network).” ’179 patent, 27:5-8. In this embodiment, “a dedicated 5 GHz radio is used as the dedicated backhaul.” ’179 patent, 29:47-53.

In addition to “regular WLAN services (e.g., data packet forwarding to and from the gateway and the Internet)” provided to client devices, the mesh points can “form one or more dedicated backhaul links among the mesh points.” ’179 patent, 27:8-14. For example, “such backhaul links may be used to perform control and management functions,” or “to provide more throughput, and/or to provide fault tolerance to the mesh network (e.g., to provide redundancy against temporary interference, etc.).” ’179 patent, 27:14-21.

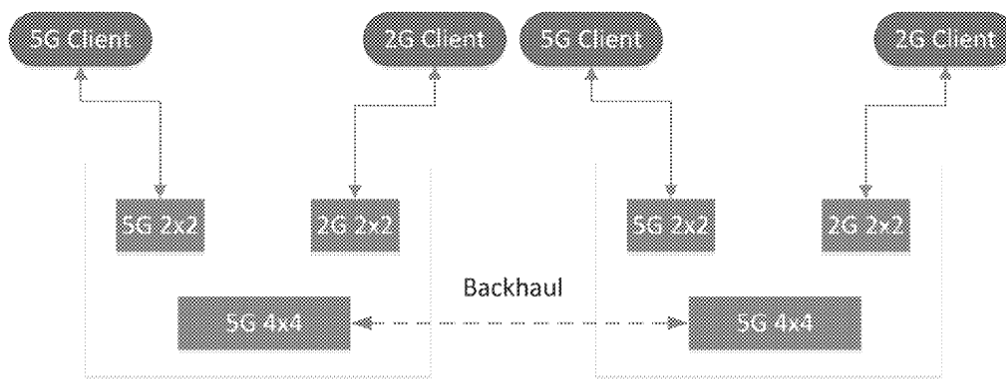


FIG. 19

'179 patent, Figure 19

30. The '179 patent discloses embodiments where the mesh points are “equipped with one or more of: a powerline communication circuit . . . , a dedicated 5 GHz radio circuit, and/or a sub-1 GHz radio circuit, for purposes of establishing the dedicated backhaul link.” ’179 patent, 27:34-39. The '179 patent further discloses that the backhaul can be switched from the “dedicated link” to

“the 2.4 GHz or 5 GHz radio that [the] device uses to communicate to [the] client.” ’179 patent, 27:45-50. (“Fault tolerance mechanisms are built in to the system such that, for example, when the dedicated link is not functioning or when the performance of dedicated link is significantly below the 2.4 GHz or 5 GHz radio that device uses to communicate to client, the best communication link can be used as the backhaul link.”); *see also, e.g.*, ’179 patent, 28:54-67, 29:60-30:18. The dedicated backhaul link in this embodiment would be an example of the “backhaul communication, separate from the forward wireless communication” in claims 1 and 11, and the communication established using the 2.4 GHz or 5 GHz radio that device uses to communicate with the client would be an example of the “forward wireless communication.”

VI. Claim construction of “forward wireless communication”

31. The terms “forward wireless communication” and “backhaul communication, separate from the forward wireless communication” are recited in asserted claims 1 and 11.

32. In my opinion, a POSITA would have understood the term “forward wireless communication” in the context of claims 1 and 11 and the specification of the ’179 patent to mean “client-facing wireless communication.”

33. The claims generally recite methods (claims 1-10) and devices being configured to perform a method (claims 11-19) for establishing communications

between mesh points in a mesh network. Specifically, the claims recite “a method for establishing a dedicated backhaul, ... the method being performed by a first mesh point” (claim 1) and “a computing-device comprising: one or more processors that implements a mesh point ... being configured to perform method” (claim 11). The method is comprised of “establishing [a forward wireless communication]/[a backhaul communication, separate from the forward wireless communication,] with [a]/[the] second mesh point.” The communication technologies used for establishing the two communications are recited in the two “wherein” clauses. The method further requires “constructing a list of backhaul candidates, each having a score indicative of an estimated quality of a potential link, between the first mesh point and the second mesh point.” And “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.”

34. Although the term “forward wireless communication” is not a term of art in the field of wireless mesh networking, nevertheless a POSITA would have understood the scope and meaning of the term from the above discussed claim language, as well as the specification’s description of the inventions and corresponding examples.

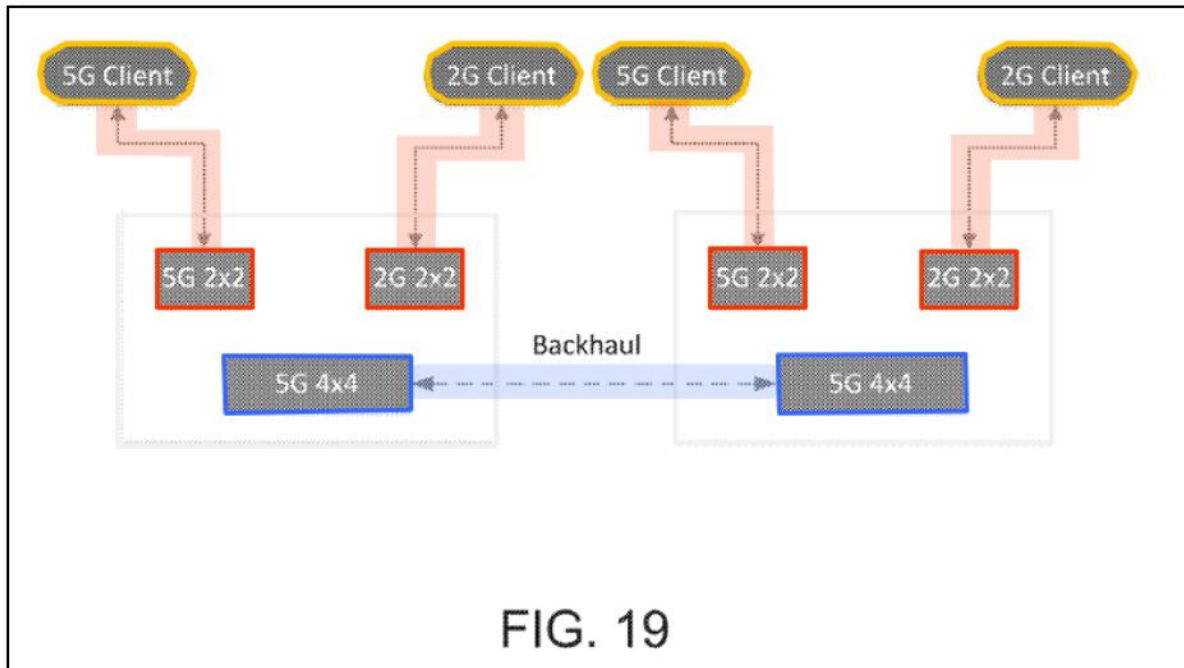
35. The features of the claimed “forward wireless communication” are consistent with the specification’s disclosures of a communication between mesh points established using general purpose radios that are also used to establish a communication with client devices. *See, e.g.,* ’179 patent, 27:39-50, 29:60-30:18, Fig. 19. Thus, a POSITA would have understood the forward wireless communication to be a “client-facing wireless communication.”

36. For example, the specification teaches that:

Dedicated Backhaul Link and Fault Tolerance

FIG. 19 illustrate[s] an example diagram showing ***a backhaul link established between two mesh points*** (e.g., in the mesh network). Besides ***regular WLAN services*** (e.g., data packet forwarding to and from the gateway and the Internet) that are ***provided by the mesh network to client devices***, in a number of implementations, the ***mesh points themselves*** in the mesh network can ***utilize one or more telecommunication circuits to form one or more dedicated backhaul links*** among the mesh points.

’179 patent, 27:8-14 (emphases added), Fig. 19. The specification thus discloses that the backhaul communication is established to form “dedicated backhaul links” by using “telecommunication circuits” that are separate from those used to provide “WLAN services (e.g., data packet forwarding ...) that are provided by the mesh network to client devices.” *Id.* This is depicted for example in Figure 19, which I have reproduced with annotations below:



'179 Patent, Figure 19 (annotated)

Here, the mesh points established a dedicated backhaul communication (blue) using dedicated 5 GHz radios that are not otherwise used by the client devices (yellow). *Id.*, 27:6-14, 29:47-54. The mesh points establish separate communications (red) with the client devices using 5 GHz and 2.4 GHz radios (different from the radio used to establish the backhaul) to provide WLAN services, or data forwarding, from the mesh network to the client devices. *Id.*, 27:6-14, 29:47-54, 27:34-50. The specification teaches that using distinct resources for the backhaul communication and WLAN services “may provide more throughput, and/or to provide fault tolerance to the mesh network (e.g., to provide redundancy against temporary interference, etc.).” *Id.*, 27:17-21.

37. The specification further discloses embodiments wherein mesh points may be equipped with combinations of “dedicated backhaul circuits” and separate client-facing WLAN radios “to form different parts of the mesh network” and provide “fault tolerance” when the dedicated backhaul underperforms. *Id.*, 27:34-50. The specification teaches that the mesh points may establish dedicated backhaul communications using “dedicated backhaul circuits,” consistent with those recited in claims 1 and 11 for the claimed “backhaul communication, separate from the forward wireless communication.” *Id.*, 27:34-42 (“mesh points may be equipped with one or more of: a powerline communication circuit (e.g., HomePlug™ 1.0, AV, or AV2 compliant), a dedicated 5 GHz radio circuit, and/or a sub-1 GHz radio circuit, for purposes of establishing the dedicated backhaul link.”).

38. These mesh points may also be equipped with “general purpose 2.4 GHz and 5 GHz WLAN radios,” consistent with the communication technologies used to establish the claimed “forward wireless communication,” in addition to the “dedicated backhaul circuits.” *Id.*, 27:34-42. These 2.4 and 5 GHz general purpose radios are used to establish communications with the client devices and may also be used to establish communications between mesh points, consistent with the claimed forward wireless communication. *Id.*, 27:39-50. The specification explains that by establishing these separate communications

between the mesh points—e.g., one with a dedicated backhaul circuit and one with a general purpose radio—“fault tolerance mechanisms are built in the system such that, for example, when the dedicated link is not functioning or when the performance of dedicated link is significantly below the 2.4 GHz or 5 GHz radio that device uses to communicate to client, the best communication link can be used as the backhaul link.” *Id.* A POSITA reading this disclosure would have understood the direct parallels with the claimed communications: (claimed backhaul communication ↔ dedicated backhaul communication) and (forward wireless communication ↔ the communication established using client facing radios).

39. In another embodiment, the specification explains a general hierarchy for backhaul communication selection. '179 patent, 29:59-30:18, Fig. 22C. If the “current backhaul is underperforming (e.g., drops below a certain threshold), ... then ... an alternative backhaul is considered.” *Id.*, 29:65-30:1. The specification teaches that “a general purpose resource (i.e., client facing resource)” may be considered for the backhaul. The client-facing resource may be used to establish the backhaul communication wherein “the mesh point can utilize a select portion of the client facing resource as the backhaul. ... In one example . . . the client facing resource then would be serving both front end and back end traffic[.]” *Id.*, 30:7-15. The specification thus again explains

establishing separate communications between mesh points using different types of communication technology, so that if the established backhaul communication underperforms, a different communication may be used. *Id.*; see also *id.*, 27:51-28:41, 11:61-65, Figs. 22A-22B.

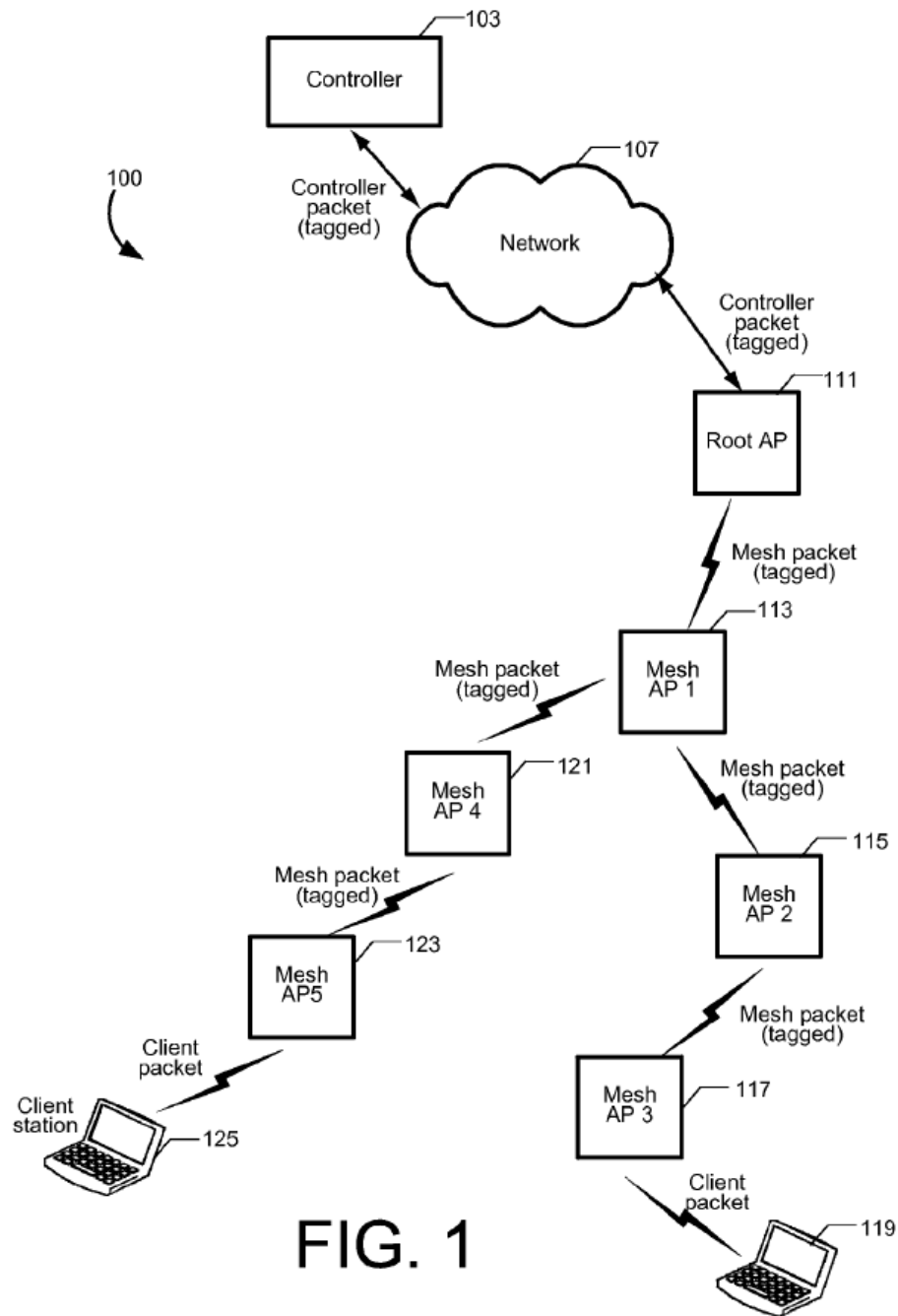
40. The recited features of the claimed forward wireless communication—separate from a backhaul communication, established using the 2.4 GHz or 5 GHz frequencies, and carrying backhaul traffic when the established backhaul drops below a quality threshold—directly align with those of the communication established between mesh points using general purpose, or client-facing radios, as disclosed in the specification and the provisional applications. *See, e.g.*, '179 Patent, 27:34-50, Fig. 19; Ex. 2006, Figs. 2A and 2B.

VII. A POSITA would not have found claims 1 and 11 obvious based on Ground IA.

A. Overview of Sinha's Network using Lightweight APs and a Remote Controller

41. Sinha is titled “Centrally Controlled Routing with Tagged Packet Forwarding in a Wireless Mesh Network.” Figure 1 of Sinha, reproduced below, “shows a simple centrally controlled mesh network 100.” Sinha, ¶ 24. The network 100 includes a root access point 111 and a set of mesh nodes that Sinha sometimes calls “mesh access points” or “mesh APs.” Sinha, ¶ 25. The network 100 includes a “backhaul topology to or from” the root AP to the mesh APs.

Sinha, ¶ 24. The root AP “is coupled to a network 107, e.g., via a switch.” Sinha, ¶ 24. The mesh APs can have “access point functionality so that a client may associate and communicate data to any point coupled to the network via the mesh.” Sinha, ¶ 24.



Sinha, Figure 1

42. In network 100, “the mesh nodes are ‘lightweight’ wireless devices whose functionality is controlled by a controller 103 that is coupled to the network 107, e.g., via a switch.” Sinha, ¶ 26. Sinha discloses that “[a] protocol is

used to exchange messages between any mesh node and the controller, e.g., using a secure tunnel between the mesh node and the controller 103.” Sinha, ¶ 26.

Sinha discloses two lightweight protocols for this purpose: LWAPP and CAPWAP.

43. LWAPP stands for “Light Weight Access Point Protocol” and according to Sinha was developed by Cisco Systems, Inc. Sinha, ¶ 26. CAPWAP stands for “Control And Provisioning of Wireless Access Points” and is a “later version of LWAPP” according to Sinha. ¶ 26.

44. Sinha discloses that its disclosure assumes “lightweight APs controlled by a controller via a secure CAPWAP tunnel.” Sinha, ¶ 29.

B. Overview of Sinha’s Disclosure Relating to Non-Lightweight APs

45. Sinha’s disclosure is “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.” Sinha, ¶ 131. Sinha discloses, however, that “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.” Sinha, ¶ 131. “For example, in the case access point capability is included, certain aspects of the present invention may also be applicable also to mesh APs that are not lightweight APs.” Sinha, ¶ 131.

Paragraph 131 appears to be the only discussion of the applicability of the invention to non-lightweight APs in Sinha.

46. From Sinha's disclosure, a POSITA would have understood that a non-lightweight AP "include[s] enough capability to not need [a lightweight protocol] for a controller to function." Sinha, ¶ 131. This is easily understood from Sinha's words themselves.

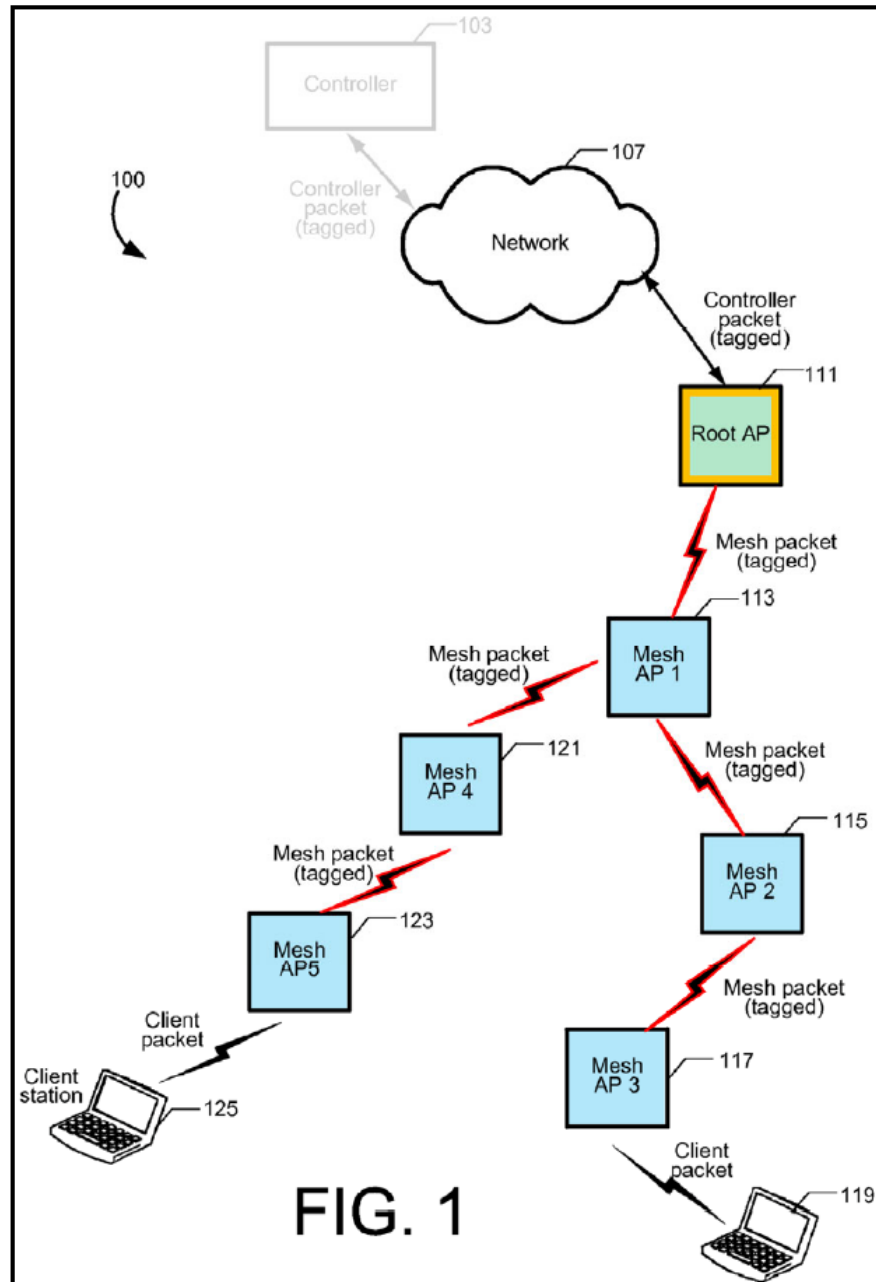
47. A POSITA would have also understood from Sinha's disclosure that the "protocol" described as not being needed for a controller to function with non-lightweight APs includes LWAPP and CAPWAP. Sinha explicitly mentions "LWAPP or other protocol connection" as not being needed for a controller to function. Sinha, ¶ 131. Further, Sinha discloses CAPWAP as a later version of LWAPP and states that CAPWAP is the assumed lightweight AP protocol in its specification. Sinha, ¶¶ 26, 29. Sinha also mentions LWAPP and CAPWAP together in the first sentence of paragraph 131 as providing the "secure tunnel" for the lightweight APs. Sinha, ¶ 131.

48. Furthermore, a POSITA would have understood from Sinha's disclosure that Sinha does not disclose or suggest any modifications to the remote centralized controller 103 in the discussion of non-lightweight APs, aside from not needing to use LWAPP, CAPWAP, or other protocol for controlling

lightweight APs. Rather, Sinha discloses that the “invention” is “also applicable” to such APs.

C. Overview of Petitioner’s Proposed Modification of Sinha

49. Petitioner proposes to incorporate the remote centralized controller 103 into the Root AP 111. Petition, 15-19. Petitioner asserts that “[a] POSITA would understand and find obvious, however, that Sinha’s centralized controller could be integrated into any of Sinha’s MAPs [Mesh Access Points].” Petition, 16. Petitioner illustrates this modification with what it calls “Figure 1M,” reproduced below. Petition, 16. I note that Figure 1M does not appear in Sinha. According to Petitioner, Sinha’s discussion of “a non-lightweight architecture” describes that “the controller is integrated in a MAP, eliminating the need for [a] controller-to-MAP protocol connection.” Petition, 15.



Petitioner's Figure 1M, modifying Sinha's Figure 1 (Petition, 16)

50. Petitioner asserts that “[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.” Petition, 16-17.

51. Petitioner further asserts that “a POSITA interested in integrating Sinha’s centralized controller in RootAP to reduce complexity and cost would have been motivated to consult Liu for this purpose. Petition, 17. According to Petitioner, “[h]aving consulted Liu, a POSITA would have understood that integrating a centralized controller into Sinha’s RootAP would have provided the benefits of higher integration and reduced communication complexity.” Petition, 18. Petitioner finally asserts that “the use of Liu’s centralized architecture with Sinha would be a combination of prior art elements according to known methods, and also application of a known technique to a known system ready for improvement, both with predictable results.”

52. As I explain in the following sections, I disagree that a POSITA would have understood Sinha’s discussion of non-lightweight APs to disclose or suggest integrating the controller into the Root AP.

D. Petitioner misinterprets Sinha’s disclosure relating to non-lightweight APs.

53. As I mention above, Petitioner’s proposed modification of Sinha is based on its statement that “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.” Petition, 15.

54. I disagree. First, Sinha does not describe a “non-lightweight *architecture*.” Petition, 15 (emphasis added). Rather, in paragraph 131 Sinha describes that its invention is applicable to 1) mesh nodes that are lightweight, using a secure tunnel to communicate with a controller, or 2) “mesh nodes that are not ‘lightweight’” and would not need the secure tunnel from a lightweight protocol for the controller to function. Sinha, ¶ 131. Sinha does not describe any architectural changes are needed for its invention to apply to such mesh nodes aside from the fact that a lightweight protocol connection is no longer needed “for a controller to function.” Sinha, ¶ 131. This disclosure does not teach any other changes in architecture—let alone the specific modification of moving the remote centralized controller into the WLAN and specifically into the Root AP.

55. Petitioner does not explain why it interprets Sinha to disclose this modification. Petition, 15-16. Dr. Ding does not offer any additional explanation, either. Ex. 1002, ¶¶ 71-75. Petitioner seems to assume that Sinha’s disclosure of MAPs “includ[ing] enough capability to not need an LWAPP or other protocol connection for a controller to function” (Sinha ¶ 131) means that the controller’s capabilities are integrated into the MAP such that there is *no* connection between a MAP and a controller because they have become the same entity. *See* Petition, 15-16. This is not a correct assumption. Even with non-lightweight APs having “enough capability to not need an LWAPP or other protocol connection,” Sinha’s

controller still “function[s]” when applied to this embodiment. Sinha, ¶ 131.

Sinha does not disclose that the controller is integrated into any other component, or that any two entities would be collapsed into one entity when applying the invention to non-lightweight APs.

E. A POSITA would not have modified Sinha in the manner proposed by Petitioner.

56. Petitioner’s discussion of Liu in relation to the modification of Sinha is premised on the idea that Sinha discloses integrating the centralized controller into the MAP. Specifically, Petitioner asserts that a POSITA “would have been motivated to consult Liu” if the POSITA was already interested in “integrating Sinha’s centralized controller” into the Root AP. Petition, 17. As I discussed above, Sinha does not disclose or suggest such integration, and therefore a POSITA reading Sinha would not have been motivated to consult Liu.

57. Additionally, I disagree with Petitioner’s statements about the benefits of integrating the centralized controller in the Root AP. Petitioner asserts that the proposed integration “reduces the number of network devices and connections, thereby reducing complexity and cost.” Petition, 16-17. Dr. Ding describes this as a “one-box” solution as opposed to the “two-box” solution of Sinha’s Figure 1. Ex. 1002, ¶ 75. But merely reducing the number of boxes in a block diagram does not necessarily “reduc[e] complexity and cost.” Petition, 16-17. Petitioner and Dr. Ding have ignored that the “single box” is not the same as

the Root AP—it has incorporated the functionality of an entirely different device that serves a different purpose. Such a single box would therefore have been a much more complex and expensive *new* box in the network, a fact that does not allow for simple apples-to-apples comparison of complexity and cost by merely counting boxes. Absurd results come from this type of reasoning. For example, under this box-counting logic, every component should be integrated into one to reduce complexity and cost. This over-simplistic reasoning ignores the obvious downsides of integration—in addition to the obvious over-complexity of putting everything in one device, a remote central controller provides benefits such as 1) reuse—a remote centralized controller can control more than one network, not just a single one as in Petitioner’s proposed combination, leading to a) lower cost of a single centralized controller that serves more than one network, and b) allowing more optimal operation across multiple networks; 2) mobility—handling of mobile clients migrating between networks (I note that Sinha discloses “mobile device[s]” in ¶ 128); 3) modularity—the controller or Root AP can be separately upgraded or changed on their own without having to replace a massive integrated box; and 4) management redundancy—it is possible that one device (e.g., the Controller 103) is managed by one entity, while other device (e.g., the Root AP 111) is managed by another entity.

F. Petitioner's proposed modification of Sinha does not disclose nor render obvious claim element [1.2]/[11.2].

58. Claims 1 and 11 recite “establishing a backhaul communication, separate from the forward wireless communication, with the second mesh point.” Petitioner has labeled this claim element as [1.2]/[11.2]. Petition, 23.

59. In Ground IA, Petitioner asserts that a “backhaul path dedicated for carrying control information, referred to as a ***control path***, between RootAP (claimed first mesh point) and AP 117 (claimed second mesh point)” constitutes the claimed “backhaul communication, separate from the forward wireless communication” in claims 1 and 11. Petition, 26-28 (emphasis in Petition).

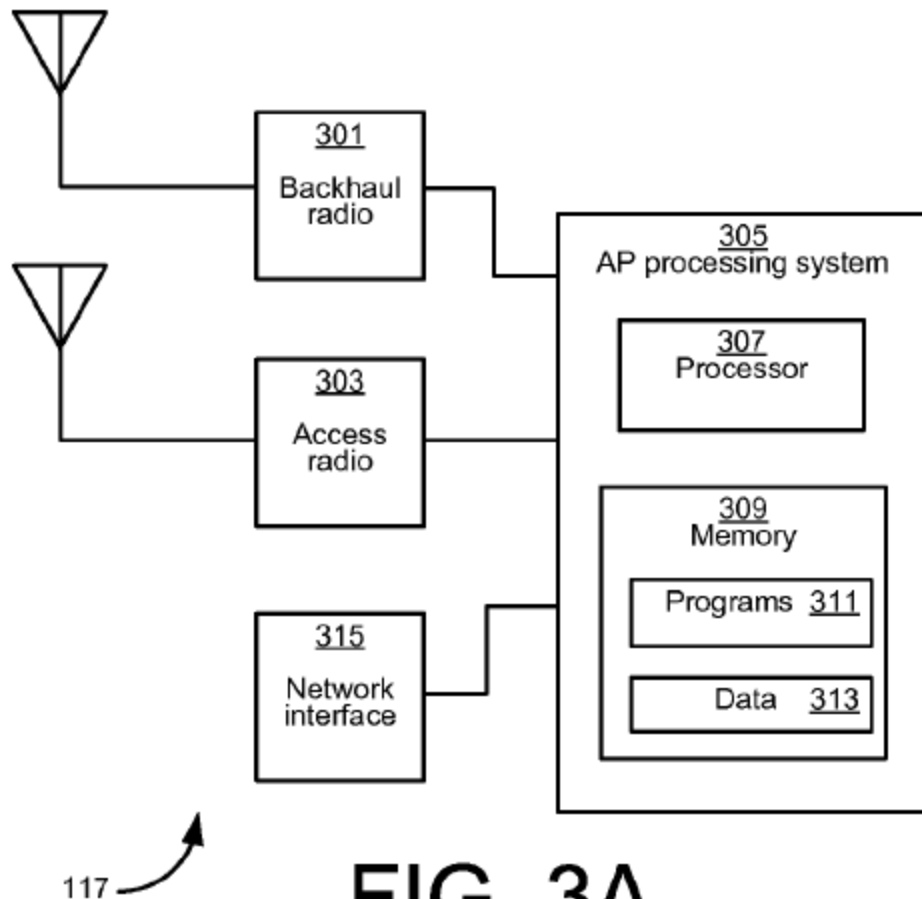
60. However, the alleged control path that Petitioner relies on in Sinha is “***for CAPWAP control packets***.” Petition, 27 (quoting Sinha, ¶ 36) (emphasis in Petition). There would be no CAPWAP control packets—and therefore no control path—under Petitioner's modification of Sinha. As I discussed above, Petitioner relies on Sinha's disclosure of non-lightweight APs that “include enough capability to ***not need an LWAPP or other protocol connection*** for a controller to function.” Petition, 15-16 (quoting Sinha, ¶ 131) (emphasis in Petition). I discussed above that Sinha's disclosure of not needing “LWAPP or other protocol connection” would include CAPWAP, which is a “later version of LWAPP.” Sinha, ¶ 26. Thus, in the non-lightweight embodiment relied upon by Petitioner, there is no “control path for CAPWAP control packets” and Petitioner

has not cited to any other possible control path for disclosure of element [1.2]/[11.2].

G. Petitioner's proposed modification of Sinha does not disclose or suggest a "forward wireless communication" as a POSITA would have understood that claim term.

61. As I discussed above in Section VI, a POSITA would have understood the term "forward wireless communication" to mean a client-facing wireless communication.

62. Petitioner asserts that "[a] backhaul path dedicated for carrying/forwarding client's traffic data between RootAP (claimed first mesh point) and AP 117 (MAP3) (claimed second mesh point) in Figure 1/1M, referred to as a **data path**, is an example of the claimed forward wireless communication." Petition, 23. Petitioner does not assert, however, that this supposed "backhaul path dedicated for carrying/forwarding client's traffic data" is a client-facing wireless communication. In my opinion, it is not a client-facing wireless communication, because it does not use a radio that is client-facing. Rather, as shown in Figure 3A, reproduced below, Sinha's APs use separate radios for backhaul (backhaul radio 301) and client-facing communication (access radio 303).

**FIG. 3A****Sinha, Figure 3A**

63. Sinha does not disclose that access radio 303 would be used for any backhaul, let alone the supposed “backhaul path dedicated for carrying/forwarding client’s traffic data.”

VIII. A POSITA would not have found claims 1 and 11 obvious based on Ground IB.

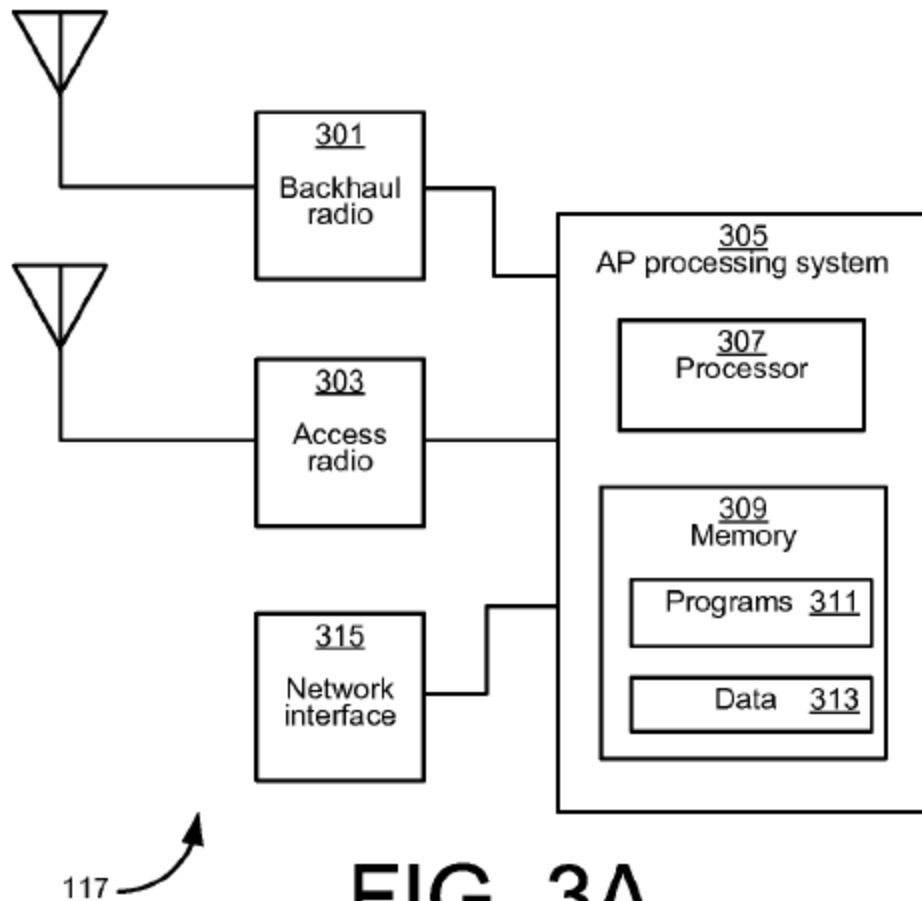
64. In Ground IB Petitioner again relies on the integration of Sinha’s centralized controller 103 into a Root AP 111 in Figure 1. Petition, 48 (relying on Figure 1M from Ground IA). Thus, in my opinion, the combination of Sinha and

Liu in Ground IB would not have been obvious to a POSITA for the same reasons I discussed above for Ground IA.

65. Petitioner proposes another modification in Sinha in Ground IB. For the reasons that I discuss below, a POSITA also would not have made this additional modification to Sinha.

A. Overview of Sinha's use of radios.

66. Sinha illustrates its mesh APs as using separate radios for backhaul and client access. Figure 3A of Sinha, reproduced below, illustrates “a mesh AP that includes two radios, a first radio 301 for the backhaul’ and “a second radio 303 that is used as an access radio for data communication with clients associated with the mesh AP.” Sinha, ¶ 47. The network interface 315 “that enables the mesh AP to be coupled to a wired network, such that the mesh AP also can act as a root AP.” Sinha, ¶ 47. “The radios 301 and 303 and network interface 315 are coupled to an AP processing system 305 that includes a processor 307 and a memory subsystem 309.” Sinha, ¶ 47.

**FIG. 3A****Sinha, Figure 3A**

67. Sinha also mentions, in one sentence, an “alternate embodiment” where “the same radio is used for access and backhaul communication.” Sinha, ¶ 48. Sinha does not provide any further details about this alternate embodiment.

B. Overview of Petitioner’s Proposed Modifications to Sinha’s use of radios.

68. In Ground IB, Petitioner proposes to modify Sinha’s mesh APs to employ “a dual-radio MAP to establish both backhaul and client-facing communications, while keeping its 5-GHz ‘backhaul radio’ dedicated for

backhaul.” Petition, 46-47. Petitioner calls these new MAPs “‘repurposed’ dual-radio MAPs.” Petition, 47.

C. A POSITA would not have been motivated to “repurpose” Sinha’s mesh AP radios.

69. Nothing in Sinha suggests to a POSITA to “repurpose” a mesh AP in the manner proposed by Petitioner. In both embodiments disclosed by Sinha, a single radio is used for backhaul, and a single radio is used for client communications. See Sinha, ¶ 48. Nowhere does Sinha disclose or suggest to a POSITA to use two radios for backhaul.

70. Petitioner asserts that “a POSITA would have been motivated to deploy such ‘repurposed’ dual-radio MAPs in a mesh network to increase the amount of traffic that can be carried on backhaul paths beyond the capabilities (*e.g.*, maximum throughput) of the 5-GHz dedicated backhaul radio.” Petition, 47. I disagree. Sinha does not disclose or suggest any problem with throughput or capacity in its 5 GHz backhaul radio, nor does it suggest that “repurposing” the access radio to borrow throughput/capacity from the client-facing band would have been a desirable solution to any throughput problems. To the extent the access radio would have increased capacity of the backhaul, it would have been at the direct expense of client communications. And unlike Sinha’s disclosure of using a single radio for backhaul and client communication, Petitioner’s “repurposing” results in decreased client capacity without being counterbalanced

by the reduced cost associated with having only one RF radio in the mesh AP. A POSITA would not have been motivated to make such a modification.

71. Petitioner also asserts that “[u]sing such dual-radio MAP in a mesh network also enhances the resilience of the network because the 2.4-GHz general-purpose radio can be used to establish backhaul communication when the 5-GHz dedicated backhaul radio fails.” Petition, 47. But Sinha already builds in redundancy through the use of mesh APs—when a link to one AP fails, Sinha chooses a link to a different AP. See Sinha, Figure 3. If an entire mesh AP radio (e.g., node 331) fails, there are other mesh APs (e.g., nodes 332-334) to route communications through the network using client-facing radios. Sinha does not disclose any need to fall back on 2.4 GHz or to use 2.4 GHz as a general-purpose band in a network that has a 5 GHz band specific for backhaul communication.

72. Petitioner cites to Handforth for its assertions regarding redundancy, increased throughput, and resilience. Petition, 47 (citing Handforth, 6:64-7:18). But Handforth does not disclose or motivate using client-facing radio as a backup backhaul radio—let alone reducing client capacity for the sake of redundancy. Of course, neither does Sinha (discussed above) nor does Liu (not cited by the Petition).

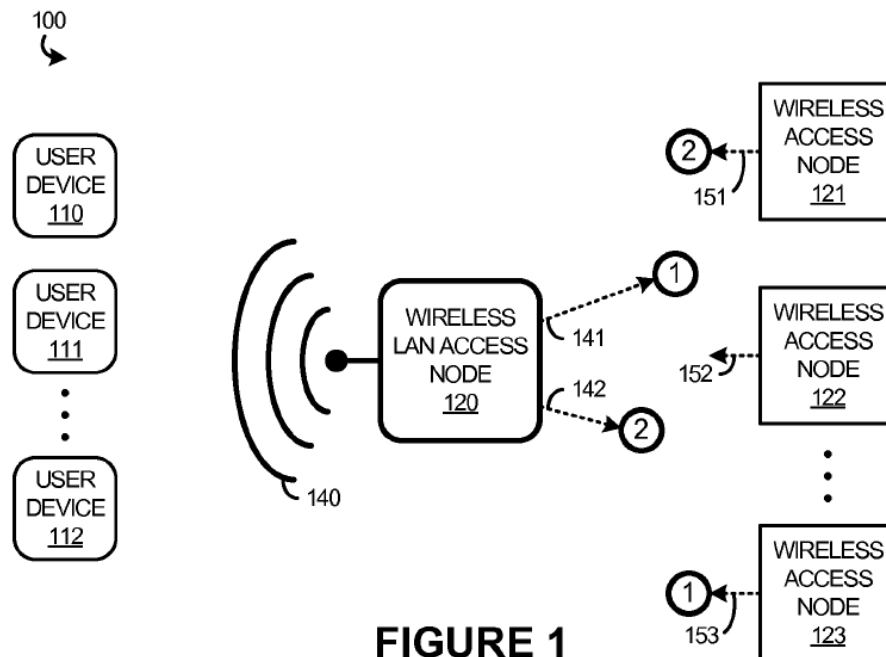
73. Petitioner asserts that “[n]o modification of the radio would be required” in its proposed modification. Petition, 47. Dr. Ding states that “[n]o

modification of the radio would be required because the radio is not concerned with whether data is going to (or coming from) an end user device or another access point that use the band.” Ex. 1002, ¶ 128. To the extent that Petitioner or Dr. Ding mean to imply that a mesh AP would not need to be modified, I disagree. The mesh AP illustrated in Figure 3A would require extensive modifications in Petitioner’s proposal. The 2.4 GHz access radio 303 is an access point disclosed as conforming to the IEEE 802.11g protocol. *See* Sinha, ¶ 49. A POSITA would not have understood an IEEE 802.11g access point to be able to communicate with other IEEE 802.11g access points without some specific configuration. Further, Sinha’s mesh APs do not have any mechanisms for falling back on a different *band* or a different *radio* for backhaul, especially one that is already being used for client access. Petitioner and Dr. Ding ignore the modifications that would be required and the challenges in doing so.

IX. A POSITA would not have found claims 1 and 11 obvious based on Ground III.

A. Overview of Gatewood

74. Gatewood is titled “Selection of Wireless Backhaul Links Based on Uptime Factors.” Figure 1 of Gatewood, reproduced below, shows a communication system with user devices 110-112 that communicates over WLAN 140 with WLAN access node 120. Gatewood, 2:23-27.

**Gatewood, Figure 1**

75. WLAN access node communicates with wireless access nodes 121-123 over wireless backhaul links 141-142. Gatewood, 2:27-29. “In some examples, WLAN access node 120 and wireless access nodes 121-123 comprise similar devices or equipment, such as in a mesh wireless local area network.” Gatewood, 2:29-32.

76. Figure 3 of Gatewood, reproduced below, illustrates communication system 300 including “various user devices 310-312 and wireless local area network (WLAN) access nodes 330-334.” Gatewood, 3:45-49. WLAN access node 330 comprises a WLAN “access point and wireless router, such as an IEEE 802.11 wireless router.” Gatewood, 3:49-52. “In some examples, WLAN access nodes 331-334 comprise similar devices or equipment as WLAN access node

330, such as in a mesh wireless local area network. In other examples, WLAN access nodes 331-334 can comprise cellular voice and data base station equipment, or other wireless equipment.” Gatewood, 3:52-57.

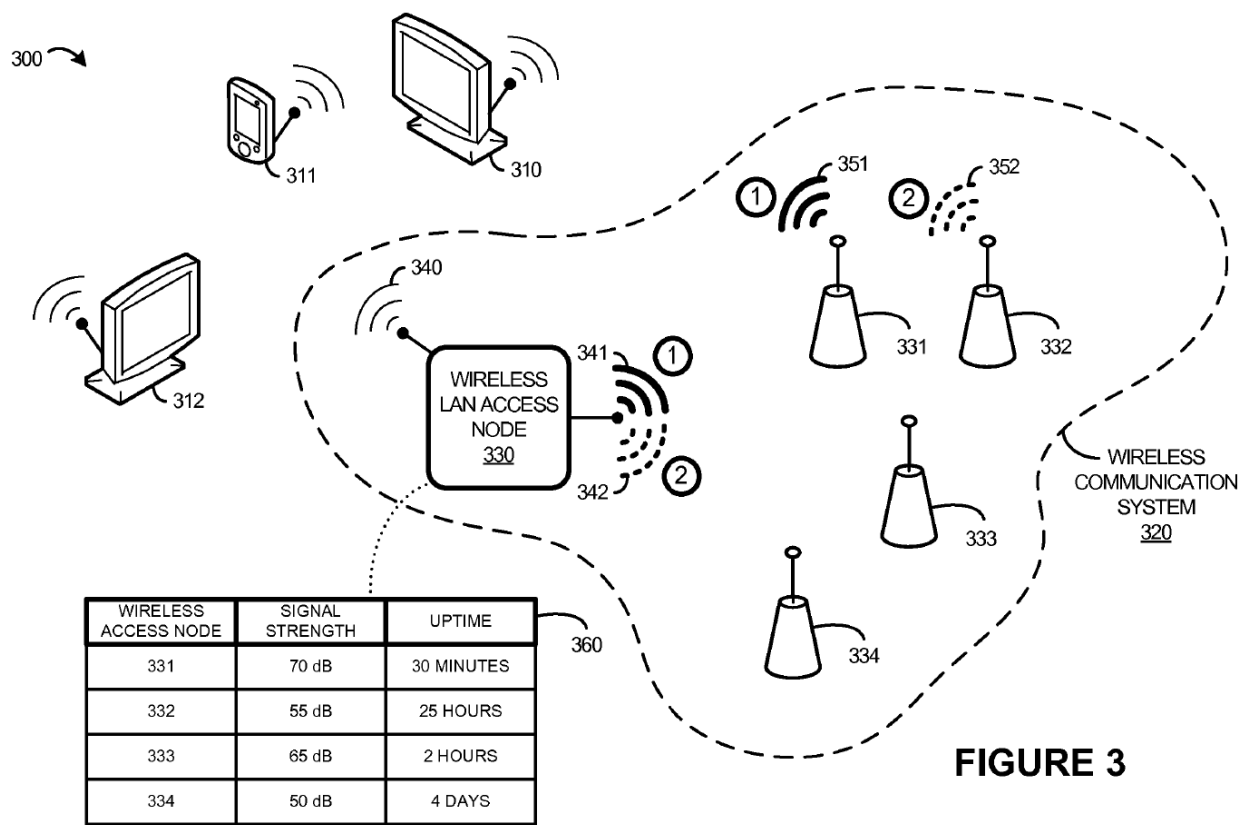


FIGURE 3

Gatewood, Figure 3

77. A POSITA would have understood that Gatewood’s network in Figure 3 does not use or need multi-hop paths between WLAN access node 330 and any other WLAN access node 331-334, because each of the WLAN access nodes 331-334 provide connectivity to other networks such as the Internet. As Gatewood discloses, “WLAN access nodes 331-334 are also communicatively coupled to further networks, communication links, and systems which can

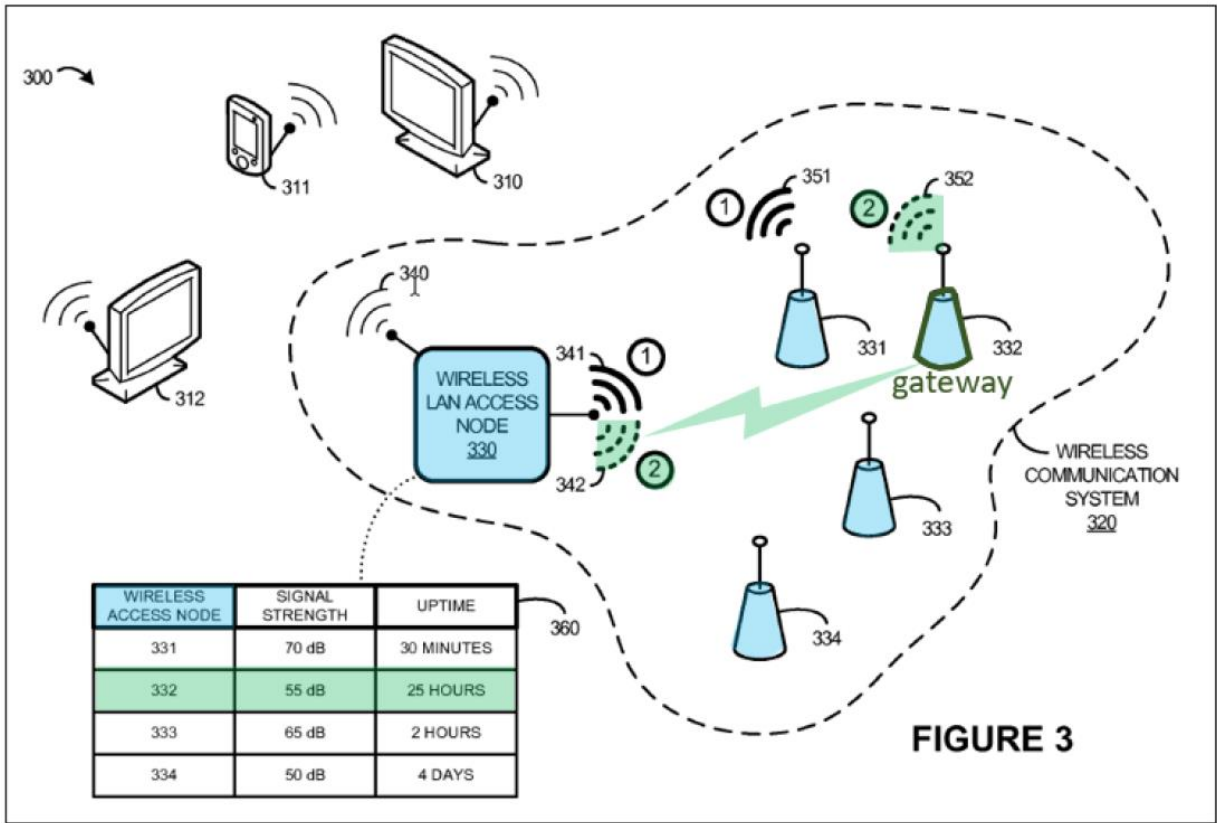
provide communication with other networks such as the Internet, corporate networks, Internet service providers, cellular voice and data core networks, and the like.” Gatewood, 3:58-62. “Although not shown in FIG. 3, each of WLAN access nodes 331-334 can have one or more additional wired or wireless links for communication with these further networks or communication links.” Gatewood, 3:63-66. “Thus, any communications backhauled through ones of WLAN access nodes 331-334, as discussed in FIG. 4, can be further exchanged over these additional wired or wireless links with the further networks or communication links.” Gatewood, 3:66-4:3.

B. Petitioner’s combination of Gatewood and Sinha in Ground III does not disclose or suggest a “forward wireless communication” as a POSITA would have understood that claim term.

78. As I discussed above in Section VI, a POSITA would have understood the term “forward wireless communication” to mean a client-facing wireless communication.

79. Petitioner asserts that the selection by WLAN access node 330 of “**a second wireless backhaul link** as a **backup** for [the] first wireless backhaul link 341” constitutes the “forward wireless communication” in claims 1 and 11. Petition, 66-67 (emphasis in Petition). Petitioner annotates Figure 3, below, to show a “backup wireless backhaul link” as link (2) highlighted in green. Petition, 67. Petitioner does not assert, however, that this supposed “backup wireless

backhaul link” is a client-facing wireless communication. In my opinion, it is not a client-facing wireless communication, because it is not using the WLAN 340 used by clients to communicate with the WLAN access node 330. Rather, as shown in Petitioner’s annotation of Figure 3, it uses a different link from what is illustrated as a different antenna.



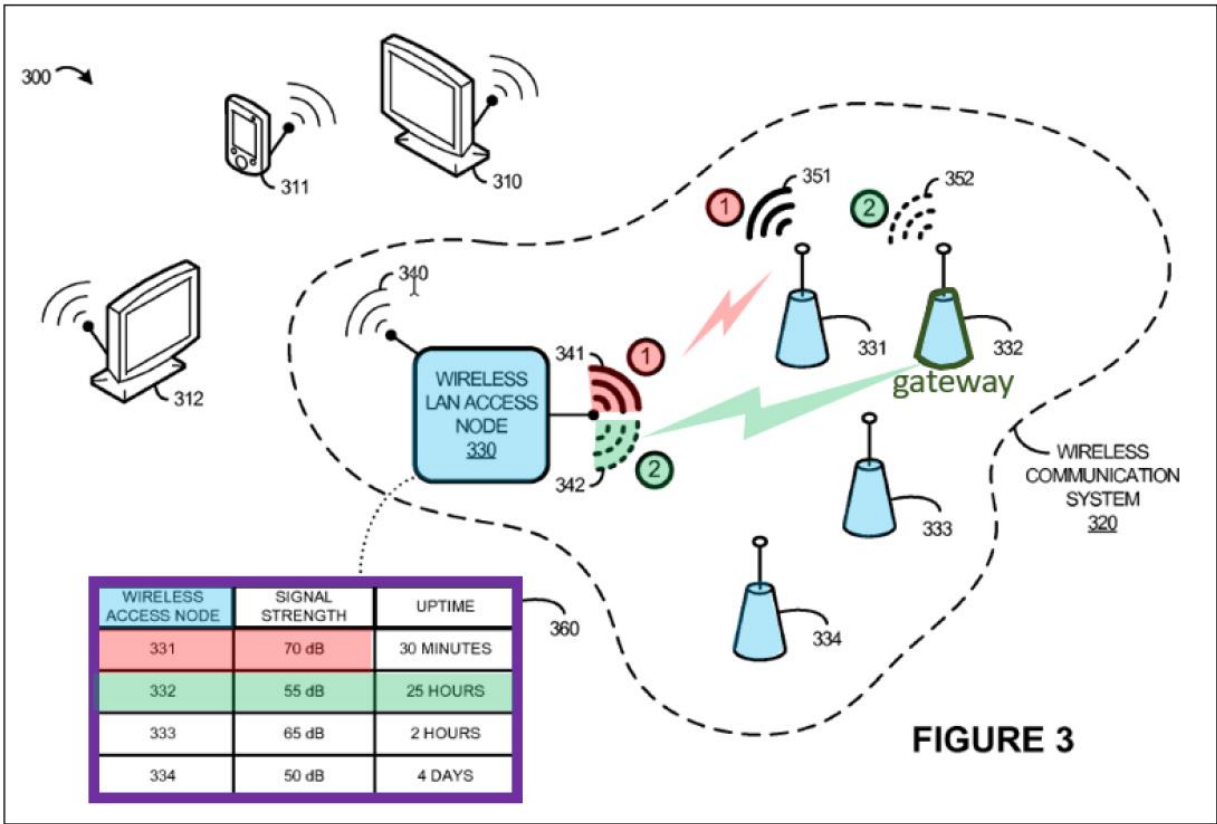
Petitioner’s annotation of Gatewood’s Figure 3 (Petition, 67)

80. Thus, Petitioner’s combination of Gatewood and Sinha does not disclose or suggest a “forward wireless communication” under the proper understanding of that term.

C. Petitioner's combination of Gatewood and Sinha does not disclose or render obvious claim element [1.2]/[11.2].

81. Claims 1 and 11 recite “establishing a backhaul communication, separate from the forward wireless communication, *with the second mesh point.*” Petitioner has labeled this claim element as [1.2]/[11.2]. Petition, 68. I note that “the second mesh point” in claim element [1.2]/[11.2] relates back to “a second mesh point” in claim element [1.1]/[11.1]. The claims recite establishing a “forward wireless communication” and a “backhaul communication” with the same “second mesh point.”

82. As I discussed in the previous section, Petitioner points to a “second wireless backhaul link” with WLAN access node 332, as the forward wireless communication. Petition, 66. For the “backhaul communication, separate from the forward wireless communication” in claim element [1.2]/[11.2], Petitioner cites to a “first wireless backhaul link” to WLAN access node 351. Petition, 69-70. Petitioner annotates Figure 3 of Gatewood, below, to show the “first wireless backhaul link” (purported “backhaul communication”) with a red (1) and “second wireless backhaul link” (purported “forward wireless communication”) with a green (2). Petition, 70.



Petitioner’s Annotation of Figure 3 (Petition, 70)

83. As is clearly shown in Petitioner’s annotation, the first and second wireless backhaul links are between the WLAN access node 330 and two separate WLAN access nodes: node 331 (first backhaul link) and node 332 (second backhaul link). This does not satisfy the claim requirement that the “forward wireless communication” and the “backhaul communication, separate from the forward wireless communication” both be established from the same first mesh point to the same second mesh point.

84. Petitioner asserts that the first wireless backhaul link (1) is actually a backhaul communication to node 332 where node 332 acts as a gateway and the

link (1) to node 331 is used as a first hop to gateway node 332. Petition, 70-71 (“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.”). The Petition specifically cites to column 3, lines 58-66 of Gatewood as “teach[ing], MAP.332 . . . is an exemplary gateway providing access to the Internet.” Petition, 70. I disagree that the link (1) is part of a two-hop path to node 332. As I explained in my Overview of Gatewood, 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. See Gatewood, 3:58-4:3. Not only does Gatewood not designate node 332 as any different than any other node, to the extent Petitioner calls node 332 a gateway, all of the nodes 331-334 are gateways, and no hops are needed between them for the client data to get to other networks, e.g., the Internet.

85. Petitioner next asserts that apart from Figure 3, which illustrates a single link between WLAN access node 330 and the other respective nodes, “Gatewood teaches that there are multiple candidate backhaul links between any two MAPS—such as between MAP.330 and MAP.332.” Petition, 71. Petitioner cites column 10, lines 23-31 of Gatewood (Petition, 71), which states:

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.*

Gatewood, 10:23-31 (emphasis added).

86. I disagree that this passage of Gatewood teaches “multiple candidate backhaul links between any two MAPs—such as between MAP.330 and MAP.332.” Petition, 71. Although Gatewood discloses that “further wireless links can be shown” in Figure 1 (and does not reference Figure 3 in this passage), 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.

87. Nor does Gatewood disclose that these “further wireless links” are for backhaul of client data, but rather discloses that when “further wireless links” are shown, “portions of the further wireless links [are] shared and used for different communication sessions or different content types, among other configurations.” Gatewood, 10:28-31. But even if this passage of Gatewood did disclose multiple links between access nodes, and even if those multiple links

were 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. Therefore, Gatewood does not provide a POSITA with any reason that such links would even be serviceable as backups (e.g., that they would have enough capacity to serve as backhauls, that they would have performance decoupled from the other links such that they would still be serviceable if a first link to the node failed, etc.). Petitioner reads much more from this single sentence of Gatewood than a POSITA would have understood.

88. Petitioner cites Sinha as supporting its assertion that “[e]stablishing multiple redundant backhaul links between any two MAPs was in fact well-known and expressly taught in Sinha.” Petition, 71 (citing Sinha, ¶ 103). I note that Petitioner does not assert that a POSITA would have modified Gatewood based on Sinha, and in my opinion a POSITA would not have made any such modification based on Sinha. As I discussed relating to Grounds IA and IB, Sinha discloses redundant paths between nodes over multiple hops. Gatewood, however, does not need multiple hops as I explained above, and does not need additional redundancy. Notably, a POSITA would have understood that Gatewood provides redundancy through the deployment of multiple wireless nodes 331-334, each having a separate link to the WLAN access node 330 that

serves client devices. *See* Gatewood, Figure 3. Additional 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, as Gatewood explicitly teaches. *See* Gatewood, 4:59-61 (“WLAN access node 330 selects (403) a second wireless backhaul link as a backup for first wireless backhaul link 341 based on signal strength and uptime information.”).

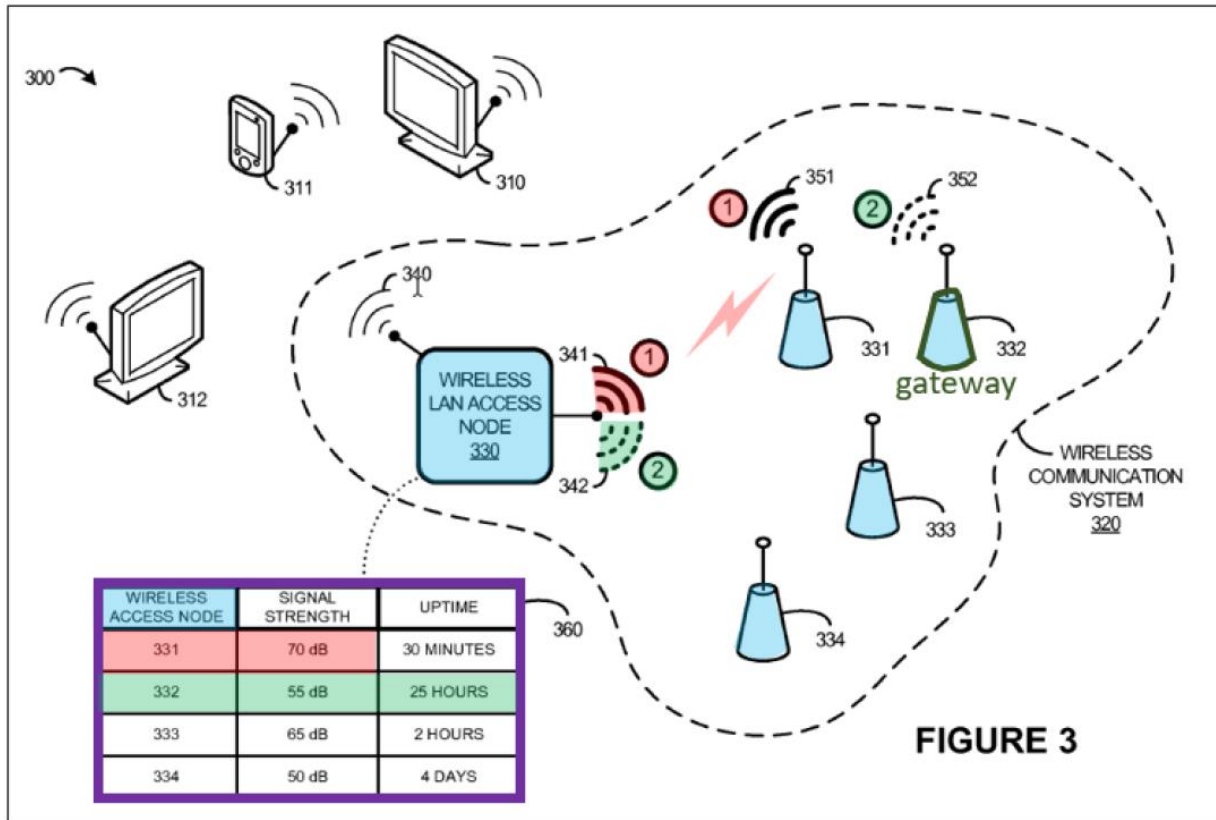
D. Petitioner’s combination of Gatewood and Sinha does not disclose or render obvious claim element [1.5]/[11.5].

89. Claims 1 and 11 recite “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.***”

Petitioner has labeled this claim element as [1.5] or [11.5]. Petition, 74.

90. Petitioner cites to Gatewood’s “data structure 360” in Figure 3 as disclosing the “list of backhaul candidates” in element [1.5]/[11.5]. Petition, 74-75. However, as plainly shown in Figure 3, the data structure 360 contains a table of entries with signal strength and uptime for links that are to different wireless mesh nodes 331-334, which does not constitute 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***” as claimed. For example, Petitioner states that mesh node 332 is the “second mesh point,” but the other entries in Gatewood’s data structure 360 contain signal

strengths for links to other nodes 331, 333, and 334 and not the same “second mesh point” (332) as required by the claim language.



Petitioner’s annotation of Gatewood, Figure 3 (Petition, 76)

91. Petitioner uses the same interpretation of Gatewood that I disagree with for claim element [1.2]/[11.2], above. Specifically, Petitioner asserts that “[e]ach candidate link on this list would allow MAP.330 to reach MAP.332” in a multi-hop fashion assuming only node 332 is the gateway in the network. Petition, 75. I disagree for the reasons stated above for element [1.2]/[11.2]—specifically, Gatewood neither discloses nor renders obvious multiple links

between two nodes in the network, nor would a POSITA have understood Gatewood to disclose or use multiple hops in its network.

92. Petitioner cites to “Gatewood-Sinha” as “render[ing] this element obvious.” Petition, 78. Petitioner cites to one sentence of Sinha as disclosing “‘a priority ordered list of routes’ for ‘each class of service’ in a wireless mesh network”. Petition, 78 (quoting Sinha, ¶ 58). But as I discussed above for claim element [1.2], 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. Gatewood, 3:58-4:3. Petitioner asserts that a POSITA would have been motivated to combine Gatewood and Sinha 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.” Petition, 78. I disagree.

Gatewood already contains a mechanism to switch routes in the event of failure—i.e., by switching backhaul links to different nodes—and those routes do not need multi-hop paths. Nor would handling “multiple classes of traffic” change Gatewood’s architecture to use multi-hop routes to a single gateway. Said differently, and by a way of an example, if 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.

E. Petitioner's combination of Gatewood and Sinha does not disclose or render obvious claim element [1.6]/[11.6].

93. Claims 1 and 11 further recite “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.”

Petitioner has labeled this claim element as [1.6] or [11.6]. Petition, 78.

94. Petitioner cites to Gatewood's use of the “second wireless backhaul link 342” as “establishing an alternative backhaul communication.” Petition, 78-79. But as I discussed above for claim element [1.2]/[11.2], Petitioner's combination of Gatewood and Sinha does not disclose or render obvious that the “second wireless backhaul link 342” is to “the second mesh point” as required by claims 1 and 11. For the same reasons, the purported “alternative backhaul communication” is also not “with the second mesh point” in claim element [1.6]/[11.6].

X. Dependent claims in Grounds IA, IB, II, and III

95. In Ground IA, the Petition challenges dependent claims 2, 4-7, 12, and 14-16 as obvious in view of Sinha alone or in combination with Liu. Petition, 2. These claims depend on either claim 1 or claim 11 and are therefore not obvious for the same reasons that claims 1 and 11 are not obvious.

96. In Ground IB, the Petition challenges dependent claims 2-7 and 12-16 as obvious in view of Sinha alone or in combination with Liu. Petition, 2. These claims depend on either claim 1 or claim 11 and are therefore not obvious for the same reasons that claims 1 and 11 are not obvious.

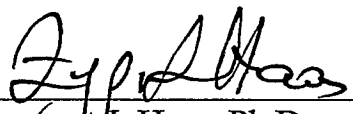
97. Petitioner lists Ground II as challenging claims 1-19 based on a combination of Sinha, Liu, and Handforth. Petition, 2. However, for claims 1-7 and 11-16 Petitioner refers back to Ground IB. Petition, 53. Thus, Ground II challenges dependent claims 8-10 and 17-19 as obvious in view of Sinha alone or in combination with Liu and Handforth. Petition, 53-59. These claims depend on either claim 1 or claim 11 and are therefore not obvious for the same reasons that claims 1 and 11 are not obvious.

98. Finally, in Ground III, the Petition challenges dependent claims 3-6 and 13-16. Petition, 2. These dependent claims depend on either claim 1 or claim 11 and are therefore not obvious for the same reasons that claims 1 and 11 are not obvious.

XI. CONCLUSION

All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. Further,² I am aware that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001. I declare under penalty of perjury that the foregoing is true and correct.

Executed on Dec 27, 2023 (date), in Richardson, TX (city, state).


Zygmunt J. Haas, Ph.D.