

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

T-MOBILE US, INC. and T-MOBILE USA, INC.,
Petitioner,

v.

BARKAN WIRELESS ACCESS TECHNOLOGIES, L.P.,
Patent Owner.

Case IPR2017-01099
Patent 9,042,306 B2

Before MEREDITH C. PETRAVICK, JOHN A. HUDALLA, and
SHARON FENICK, *Administrative Patent Judges*.

FENICK, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review, T-Mobile US, Inc. and T-Mobile USA, Inc. (collectively, “Petitioner”) challenge the patentability of claims 1–68 of U.S. Patent No. 9,042,306 B2 (Ex. 1002; “the ’306 patent”), which was assigned to Barkan Wireless Access Technologies, L.P. (“Patent Owner”).

We have jurisdiction under 35 U.S.C. § 6(b)(4). This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during this *inter partes* review. For the reasons discussed below, we determine that Petitioner has proven by a preponderance of the evidence that claims 1, 3–17, 19, 21–46, 48–56, and 58–68 of the ’306 patent are unpatentable. *See* 35 U.S.C. § 316(e) (“In an *inter partes* review instituted under this chapter, the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.”).

A. Procedural History

On March 20, 2017, Petitioner requested *inter partes* review of claims 1–68 of the ’306 patent. Paper 2 (“Pet.”). The Petition relies on Declaration of Dr. Tal Lavian (Ex. 1003). Patent Owner filed a Preliminary Response. Paper 7. We required additional briefing regarding a claim construction issue (Paper 8) and Petitioner and Patent Owner each filed supplemental briefs. Paper 9 (“Pet. Supp. Br.”); Paper 10 (“PO Supp. Br.”).

On October 6, 2017, based on the record before us and in accordance with the Board’s practice at the time, we instituted an *inter partes* review of claims 16, 17, 19, 21–46, 48–56, and 58–68. Paper 11 (“Decision on Institution” or “Dec.”), 2, 55–56. Patent Owner filed a Patent Owner

Response (Paper 19, “PO Resp.”) and Petitioner filed a Reply (Paper 22, “Pet. Reply”), referring to an additional Declaration from Dr. Lavian (Ex. 1043).

On April 27, 2018, pursuant to the Supreme Court’s decision in *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348, 1358 (2018), holding that a decision to institute under 35 U.S.C. § 314 may not institute on less than all claims challenged in the petition, we issued an Order modifying our Decision on Institution to institute review of all claims and all grounds of the Petition. Paper 26. Accordingly, the following grounds have been instituted:

Reference(s)	Basis	Claims Challenged
Buddhikot ¹ and Lord ²	§ 103	1–12, 14–22, 26–31, 34–37, 39, 40, 43, 47–53, 56–63, 65, and 66
Buddhikot, Lord, and Moran ³	§ 103	23–25, 41, 42, 44–46, 67, and 68
Buddhikot, Lord, and Abhishek ⁴	§ 103	32, 33, 54, and 55
Buddhikot, Lord, and Kim ⁵	§ 103	13, 38, and 64

See Pet. 1.

On May 3, 2018, we authorized additional briefing to address issues relating to the claims for which institution was not ordered originally in our Decision on Institution. Papers 26, 27. As per this authorization, Patent

¹ Buddhikot et al., U.S. Patent No. 7,562,393 B2, filed Oct. 20, 2003 (Ex. 1006).

² Lord et al., U.S. Patent No. 6,763,012 B1, issued Jul. 13, 2004 (Ex. 1007).

³ Moran, WO 2005/069577 A1, pub. July 28, 2005 (Ex. 1010).

⁴ Abhishek et al., U.S. Patent App. Pub. No. US 2004/0103278 A1, pub. May 27, 2004 (Ex. 1009).

⁵ Kim et al., U.S. Patent App. Pub. No. US 2004/0218611 A1, pub. Nov. 4, 2004 (Ex. 1008).

Owner filed a Supplemental Response (Paper 28, “PO Supp. Resp.”), and Petitioner filed a Supplemental Reply (Paper 29, “Pet. Supp. Reply”). Oral Argument was conducted on July 10, 2018, and a transcript of that hearing is of record. Paper 41 (“Tr.”).

B. Related Matters

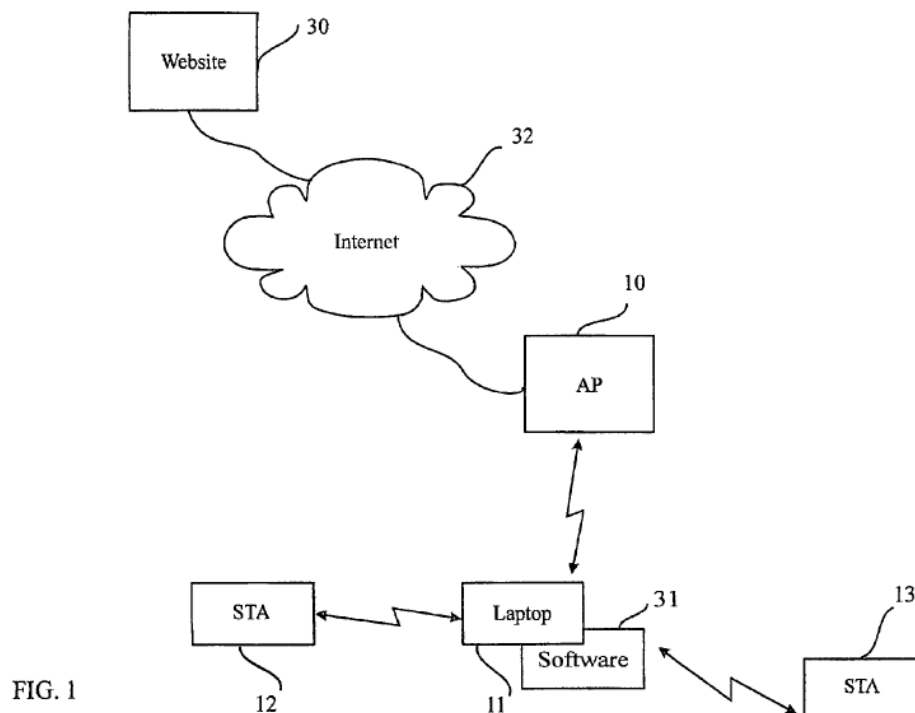
Petitioner and Patent Owner inform us that the ’306 patent is the subject of two lawsuits: *Barkan Wireless Access Technologies, L.P. v. T-Mobile US, Inc. and T-Mobile USA, Inc.*, 2:16-cv-00063 (E.D. Tex.) (filed Jan. 19, 2016) and *Barkan Wireless Access Technologies, LP v. Cellco Partnership d/b/a Verizon Wireless et al.*, 2:16-cv-00293 (E.D. Tex.) (filed Mar. 29, 2016) (“the Verizon case”). Pet. 2; Paper 4, 2.

Petitioner filed a petition for *inter partes* review of related U.S. Patent No. 8,559,369 B2 (Ex. 1001, “the ’369 patent”). Pet. 2; Paper 4, 2 (IPR2017-01098). IPR2017-01098 was terminated upon the Board granting Patent Owner’s request for adverse judgment under 37 C.F.R. § 42.73(b)(2). IPR2017-01098, Paper 19.

C. The '306 Patent

The '306 patent is titled “Wireless Internet System and Method” and generally relates to a device with Internet access through an access point that itself acts as an access point to allow other devices Internet access.

Ex. 1002, Abstr. Figure 1 of the '306 patent, reproduced below, illustrates an expanded wireless system for connecting mobile devices to the Internet through an intermediate device:



As shown above in Figure 1, the '306 patent discloses laptop 11 which is connected to Internet 32 via its access point (“AP”) 10. *Id.* at 10:49–50, 11:33–34, 11:37–38. Laptop 11 acts as a second AP for wireless-enabled devices, STA (for “station”) 12 and STA 13, with these devices connecting to the Internet 32 through laptop 11. *Id.* at Abstr., 1:31–32, 3:17–18, 11:37–41, 12:17–18.

Figure 3, reproduced below, illustrates a system including an additional AP 20, an additional laptop 21 providing a connection for stations, and other sites connected to the Internet.

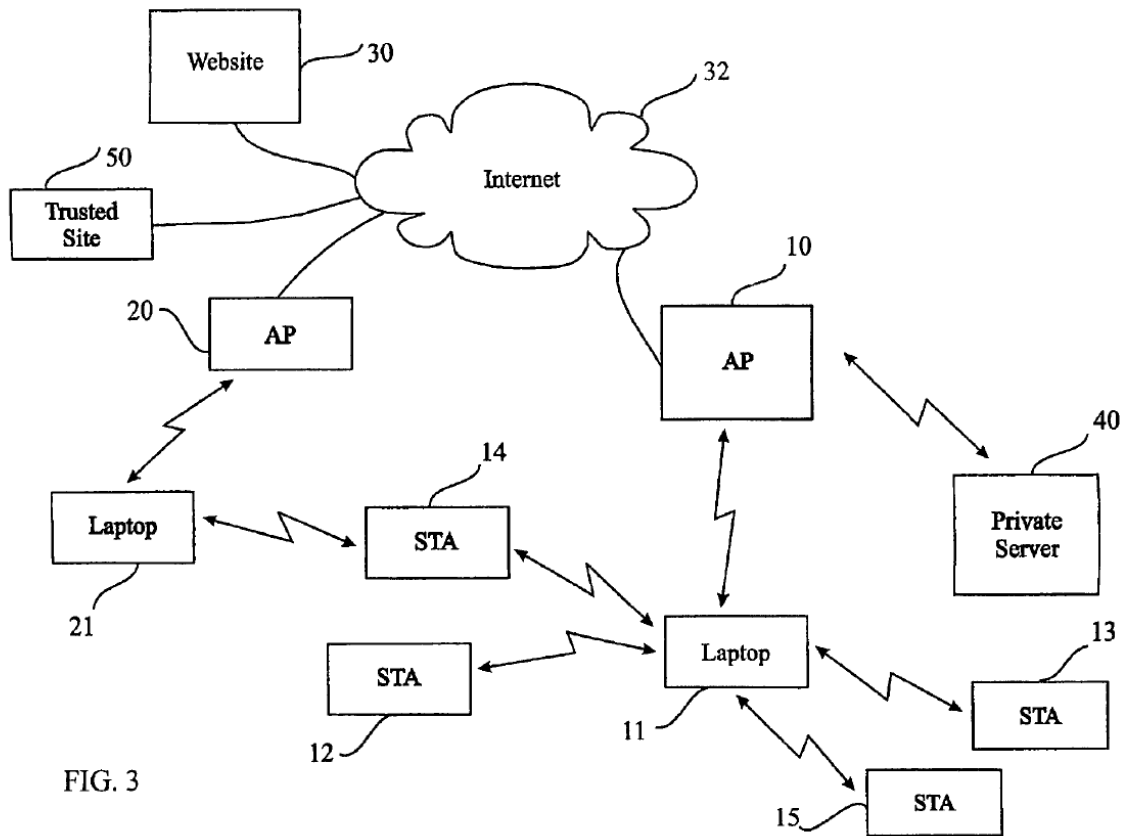


FIG. 3

Figure 3 depicts a remote site, such as trusted site 50, connected to Internet 32. *Id.* at Figure 3, 13:23–32. Trusted site 50 acts as a proxy of a wireless-enabled device, such as STAs 12–15, with each STA accessing other Internet sites via the trusted remote site. *Id.* at 13:23–25, 15:1–3. Sensitive traffic between the connected STA and the proxy passes through an intermediary device (laptop 11 or laptop 21), with the security of the traffic ensured by tunneling, in order to protect the privacy of the STA's communications. *Id.* at 14:42–45, 14:49–52, 15:1–3. Security may be enhanced for a STA accessing the Internet through a tunnel to a remote site

by frequently switching which remote site is used as proxy, so no one remote site can collect substantial information regarding a STA's use of the Internet. *Id.* at 15:8–11. Alternately, the remote site may be a trusted computer installed by the user, for example to implement a virtual private network (VPN). *Id.* at 15:14–18.

D. Illustrative Claims

Claims 1, 16, and 43 of the challenged claims of the '306 patent are independent. Claims 1 and 16 are illustrative of the claimed subject matter.

1. A computing device comprising:

at least one communication module adapted to:

- (1) wirelessly connect said computing device to an IP based network via a first wireless access point (AP) having a first AP Identification (APID); and
- (2) wirelessly communicate with other wireless enabled computing devices;

a user interface and display adapted to allow a user of said computing device to interact with destinations over the IP based network, through the first wireless AP, using a first public IP address associated with the computing device; and

an AP module adapted to:

- (1) provide a given device of the other wireless enabled computing devices with access to the IP based network by causing said computing device to serve the given device as a second AP having a second APID, distinct from the first APID, and provide the given device access to the network via the first AP; and
- (2) tunnel data traffic from the given device, through said computing device, through the first AP, through the IP network, to a proxy server, such that the proxy server acts as a proxy of the given device and the data traffic is secure from said computing device and first AP and the given device operates on the network using a second

public IP address distinct from the first public IP address, with the second public IP address associated with the given device.

16. A system comprising:

- a first wireless access point (AP) connected to an IP based network, the first wireless AP having a first AP Identification (APID);
- a proxy server connected to the IP based network and adapted to act as a proxy of at least a subset of computing devices that connect via the first wireless AP; and
- a first computing device having a user interface, wherein the first computing device is adapted to:
 - wirelessly connect to the IP based network via the first wireless AP;
 - wirelessly communicate with other wireless enabled computing devices;
 - enable a user of the first computing device to interact, through the user interface, with destinations over the IP based network, through the first wireless AP, using a first public IP address associated with the first computing device;
 - provide a second computing device of the other wireless enabled computing devices with access to the IP based network by causing the first computing device to serve the second computing device as a second AP having a second APID, distinct from the first APID, and provide the second computing device access to the IP based network via the first AP; and
 - tunnel data traffic from the second computing device, through the first computing device, through the first AP, through the IP network, to the proxy server, wherein the proxy server acts as a proxy of the second computing device and the data traffic is secure from the first computing device and the first AP and the second computing device operates on the IP

based network using a second public IP address distinct from the first public IP address, with the second public IP address associated with the second computing device.

II. ANALYSIS

A. Level of Ordinary Skill in the Art

The level of skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Petitioner asserts that the level of ordinary skill in the art to which the ’306 patent pertains would have been “at least a bachelor’s degree in computer science and/or electrical engineering or comparable experience, plus at least four years of practical experience in the design or development of telecommunications, network communication systems and wireless network-based communication between computer systems, or a master’s degree with at least two years of practical experience.” Pet. 12 (citing Ex. 1003 ¶¶ 31–36).

Patent Owner contends that the level of ordinary skill “would have been someone with a Bachelor’s degree in computer science, or in a related field, and about two years’ experience.” PO Resp. 10.

Factual indicators of the level of ordinary skill in the art include “the various prior art approaches employed, the types of problems encountered in the art, the rapidity with which innovations are made, the sophistication of the technology involved, and the educational background of those actively working in the field.” *Jacobson Bros., Inc. v. United States*, 512 F.2d 1065, 1071 (Ct. Cl. 1975); *see also Orthopedic Equip. Co., Inc. v. United States*,

702 F.2d 1005, 1011 (Fed. Cir. 1983) (quoting with approval *Jacobson Bros.*).

Both parties assert somewhat similar definitions of the level of ordinary skill in the art, with Petitioner specifying either two years more practical experience or a master's degree. Based on our review of the complete record, including the unrebutted testimony of Petitioner's declarant, we find that the evidence of record supports a level of ordinary skill in the art consistent with Petitioner's definition. In addition, we have reviewed the prior art of record in this proceeding, which we determine is consistent with this definition. *See Okajima*, 261 F.3d at 1355. We note that our patentability analysis presented below would reach the same findings and determinations under either party's definition of the level of ordinary skill in the art.

B. Claim Construction

In an *inter partes* review, a claim in an unexpired patent is given its broadest reasonable construction in light of the specification of the patent in which it appears. 37 C.F.R. § 42.100(b); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016) (upholding the use of the broadest reasonable interpretation standard). Under the broadest reasonable construction standard, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). We apply this standard to the claims of the '306 patent.

Only terms that are in controversy need to be construed and only to the extent necessary to resolve the controversy. *See Wellman, Inc. v.*

Eastman Chem. Co., 642 F.3d 1355, 1361 (Fed. Cir. 2011); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

1. “communication module adapted to: (1) wirelessly connect said computing device to an IP based network via a first wireless access point (AP) having a first AP Identification (APID); and (2) wirelessly communicate with other wireless enabled computing devices”

Claim 1 recites a “communication module adapted to: (1) wirelessly connect said computing device to an IP based network via a first wireless access point (AP) having a first AP Identification (APID); and (2) wirelessly communicate with other wireless enabled computing devices” (“the communication module limitation”). Petitioner and Patent Owner both propose that we construe the communication module limitation as a means-plus-function term under 35 U.S.C. § 112, ¶ 6.⁶ Pet. Supp. Br. 1; PO Supp. Br. 1. There is a rebuttable presumption that claim terms that lack the word “means” (a word not present in the communication module limitation) do not invoke § 112, ¶ 6. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348–49 (Fed. Cir. 2015) (en banc in relevant portion, *see n.3*). In the claim construction order issued in the Verizon case, the court concluded that the communication module limitation does not refer to a particular class of structures, and that no “recitation of . . . operation in sufficient detail to suggest structure to persons of ordinary skill in the art” is found in the limitation. Ex. 2001, 33 (quoting *Linear Tech. Corp. v. Impala Linear*

⁶ Paragraph 6 of 35 U.S.C. § 112 was renamed as paragraph (f) when § 4(c) of the Leahy-Smith America Invents Act (Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”)) took effect on September 16, 2012. Because the patent application resulting in the ’306 patent was filed before the effective date, we refer to the pre-AIA version of § 112.

Corp., 379 F.3d 1311, 1320–21 (Fed. Cir. 2004)). Consistent with the district court’s reasoning on this point, we conclude that the presumption stated in *Williamson* has been rebutted. Accordingly, we construe the communication module limitation as a means-plus-function term.

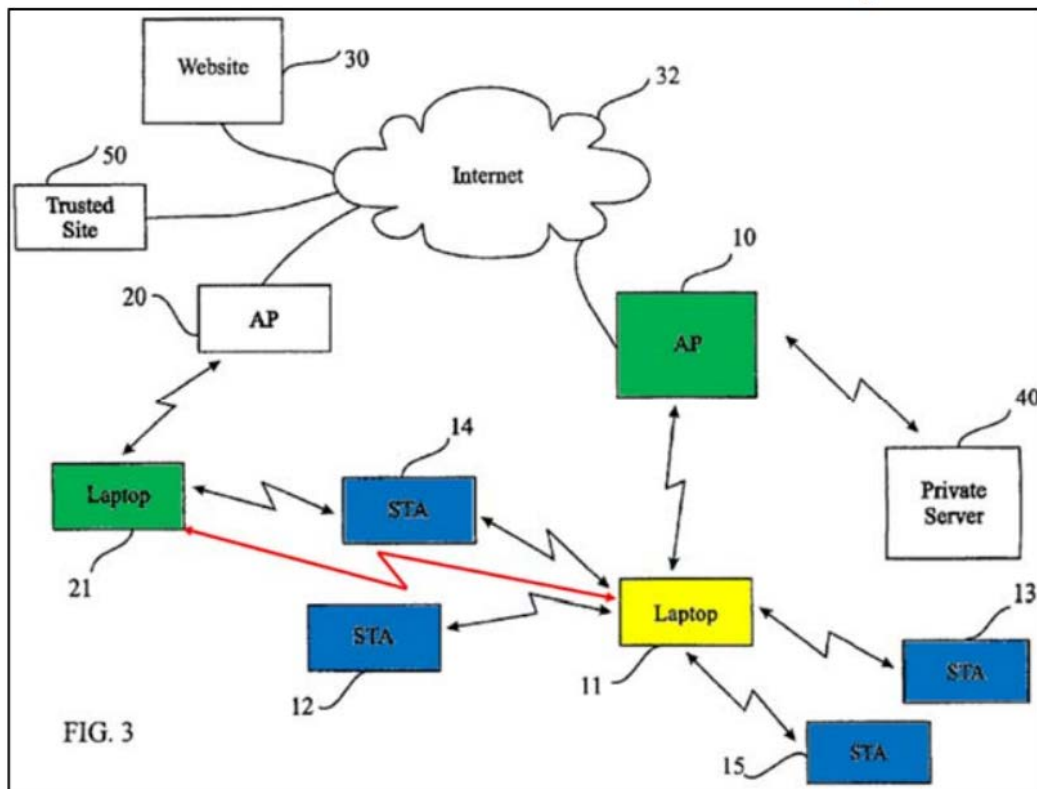
Construing a means-plus-function limitation under § 112, ¶ 6 requires us “to perform a two-step analysis. First, [we must] ‘identif[y] the particular claimed function.’ Second, [we must] ‘look [] to the specification and identif[y] the corresponding structure, material, or acts that perform that function.’” *IPCom GmbH & Co. v. HTC Corp.*, 861 F.3d 1362, 1370 (Fed. Cir. 2017) (citations omitted). In the Decision on Institution, we found the claimed function for the communication module limitation is set forth in the plain language of that limitation. Dec. 9–10. We thus found that the claimed function is to “(1) wirelessly connect said computing device to an IP based network via a first wireless access point (AP) having a first AP Identification (APID); and (2) wirelessly communicate with other wireless enabled computing devices.” *Id.* at 9–10 (quoting Ex. 1002, 32:28–32). Petitioner and Patent Owner both agree that this is the claimed function. Pet. Supp. Br. 2 n.4; PO Supp. Br. 1–2.

With respect to the corresponding structure for the claimed function, Petitioner argues in the Petition that the corresponding structure should be “software in a computing device.” Pet. 16–17. For this structure, Petitioner references portions of the Specification of the ’306 patent describing software “that utilizes the computer’s wireless interface to communicate with other devices and the Internet.” *Id.* at 16 (citing Ex. 1002, Fig. 1, 6:1–13, 9:42–10:45, 13:45–14:3, 15:20–40, 16:15–35, 17:34–45 (each describing or referring to “Vagabee” software that is installed on devices in order to

allow them to connect to the Internet via an intermediary device, and assists them afterwards to themselves serve as intermediary devices)). In the Supplemental Briefing, Petitioner indicates that we should adopt the corresponding structure identified by the district court, namely, “a wireless network card, and equivalents thereof.” Pet. Supp. Br. 2, n.3, 4; Ex. 2001, 35. Petitioner argues that this definition “encompasses” the originally proposed construction presented in the Petition. Pet. Supp. Br. 1–2. Patent Owner also argues that we should use the district court’s construction of the corresponding structure for the communication module limitation. PO Supp. Br. 2–3; *see also* Prelim. Resp. 8–10 (citing Ex. 2001, 33–34).

In the Decision on Institution, we preliminarily construed the corresponding structure for the communication module limitation to be “a single wireless network card, and equivalents thereof,” and additionally concluded that the scope of the equivalents excludes multiple wireless network cards. Dec. 9–14; Paper 16, 5–6.

Petitioner argues that our preliminary construction in the Decision on Institution was in error, because the ’306 patent contains specific disclosure that a laptop that is functioning as an AP for STAs may be connected to the Internet 32 through two APs at the same time. Pet. Supp. Reply 3-4 (citing Ex. 1002, 13:38–44, Fig. 3.) Petitioner presents an annotated version of the ’306 patent’s Figure 3, reproduced below:



Id. at 3. In this annotated version of Figure 3, the laptop 11 (annotated in yellow) that provides a connection for STAs 12–15 (annotated in blue) is connected to the Internet via AP 10 (annotated in green), as described *supra* Section I.C. *Id.* at 2–3. The '306 patent describes that laptop 21 (also annotated in green) provides an additional connection to the Internet through its AP 20. Ex. 1002, 12:56–67. Petitioner argues that the '306 patent also discloses that laptops 11 and 21 can each “treat the other as another connection” (illustrated in red) to the Internet. Pet. Supp. Reply 2 (quoting Ex. 1002, 13:41). Petitioner, thus, argues that structure corresponding to the communication module limitation’s functionality is not limited to the disclosed single wireless network card. Pet. Supp. Reply 3–4 & n.5; see Ex. 1002, 11:42–50 (disclosure relating to a single wireless network card). Rather, Petitioner contends, the disclosed structure of two wireless network

cards would be used for laptops serving as “intermediaries” (such as laptop 11), as well as for STAs that are connecting through intermediary devices, and the structure corresponding to the disclosed function includes the use of two wireless network cards, which allow connection to two APs in parallel. Pet. Supp. Reply 2–4 (citing Ex. 1002, 31:20–35); *see also* Tr. 5:13–8:21. Petitioner notes that while the specification does describe a novel single-card embodiment, it “is also replete with language that describes the novelty of the parallel connection, two-network card embodiment.” Pet. Supp. Reply 4–5 (citing Ex. 1002, 6:14–15, 9:28–33, 12:56–69, 16:21–23). Petitioner additionally argues that the subject matter of claims 4–7 of the ’306 patent requires different protocols (cellular and Wi-Fi), which necessarily would use different wireless network cards. Pet. Supp. Reply 5–7.

As mentioned, Patent Owner originally argued that the construction in the Verizon case, i.e., a wireless network card or equivalents, should apply. PO Supp. Br. 2–3. After the Decision on Institution, Patent Owner maintained that we should not change that preliminary construction. Supp. Resp. 1. Patent Owner urges that the disclosed connection of a laptop to two “upstream” APs would be performed through two communication modules, rather than a communication module with two wireless network cards. Tr. 28:22–24, 29:5–12.

The broadest reasonable interpretation of the structure corresponding to a means-plus-function term may not disregard structure disclosed in the specification. *In re Donaldson*, 16 F.3d 1189, 1194–95 (Fed. Cir. 1994). After considering the full record developed during trial, we are persuaded that the disclosed structure that includes the use of two wireless network cards corresponds to the claimed function. Having considered the arguments

and evidence developed during trial, we determine that the broadest reasonable interpretation should encompass the disclosed embodiments allowing connections for an intermediary device to two “upstream” access points, and we agree that the communication module’s functionality may encompass connections using two wireless protocols. Accordingly, we alter our prior construction, and interpret the structure for the communication module limitation to be “a wireless network card, and equivalents thereof,” without our prior restriction that the scope of the equivalents could not include two wireless network cards.

2. “*proxy server*” and “*acts as a proxy*”

Claim 16 of the ’306 patent is directed towards a system comprising, among other elements, “a proxy server connected to the IP based network and adapted to act as a proxy of at least a subset of computing devices that connect via the first wireless AP.” Ex. 1002, 33:34–36. Independent claims 1 and 43 include corresponding and similar limitations. *Id.* at 32:45–53, 36:1–10.

Petitioner proposes that the broadest reasonable interpretation of “proxy server” is “a server . . . that acts as an intermediary for requests from clients seeking resources from other servers.” Pet. 15. Patent Owner argues that we should construe “proxy server” to be “an intermediate server that accepts requests from the device and acts on behalf of the device,” which it notes is the construction of the district court in the Verizon case. PO Resp. 8–9; see Ex. 2001, 7–14. In the district court, the focus of the claim construction arguments, presented by Verizon (not a party to this *inter partes* review) and Patent Owner, was whether the proper construction of a proxy server must include the proxy server protecting the device for which it

acts as a proxy by obscuring that a request originated from that device. Ex. 2001, 7–8. The district court found that the intrinsic and extrinsic evidence presented did not compel the narrower construction, which would require that the proxy server obscure the origin of requests made on behalf of the device. Ex. 2001, 11, 14.

Petitioner argues that “[n]owhere in the specification is there any requirement that the ‘proxy server’ ‘acts on behalf of the device,’ as advocated by Patent Owner,” but instead that the specification locates the proxy server at the end of a secure tunnel. Pet. Reply 3; Pet. 15 (citing, *inter alia*, Ex. 1002 at 14:49–52, 15:1–19, 16:26–27). The ’306 patent, however, discusses this secure tunnel while detailing how a device connecting via an intermediary “accesses the Internet”—exchanging data with Internet servers “through its tunnel to the trusted network site 50.” Ex. 1002, 14:42–52. The access of data, thus, is occurring by the trusted network site for the device, having received/accepted a request from a device, acting on behalf of the device. The ’306 patent also discloses that a remote node allows for access of internal nodes in a home network as in a VPN system; again, the remote node would access VPN home network data on behalf of the device. Ex. 1002, 15:14–19. We note, relative to Petitioner’s suggested construction, that where a VPN is accessed according to the ’306 patent’s disclosure, no intermediation of a request for resources from a server is implicated if the “internal nodes” in the VPN are not servers.

Petitioner characterizes Patent Owner’s suggested construction as “incredibly broad.” Tr. 31:22. Even were we to agree that Patent Owner’s construction is broader than Petitioner’s, we do not find that Petitioner has presented any convincing reason to show that Patent Owner’s construction is

unreasonably broad and to narrow the construction. Having considered the arguments and evidence presented, we determine that the broadest reasonable interpretation of “proxy server” is “an intermediate server that accepts requests from the device and acts on behalf of the device.”

Patent Owner additionally argues that the broadest reasonable interpretation of “acts as a proxy” is “performs requests on behalf of the device.” PO Resp. 9. Petitioner argues that no additional construction is necessary, as the construction of “proxy server” “will naturally resolve the meaning of ‘acts as a proxy.’” We agree that no construction of this term is necessary in light of the construction of “proxy server.”

3. *Remaining Terms*

In our Decision on Institution, we determined that the remaining terms of the challenged claims did not require express construction at that time. Dec. 8, 14–15. Based on the record developed during trial, we maintain our initial determination that the remaining terms of the challenged claims do not require express constructions. *See Vivid Techs.*, 200 F.3d at 803.

C. *Principles of Law*

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

of nonobviousness, if in evidence.⁷ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

D. Asserted Obviousness over Buddhikot and Lord

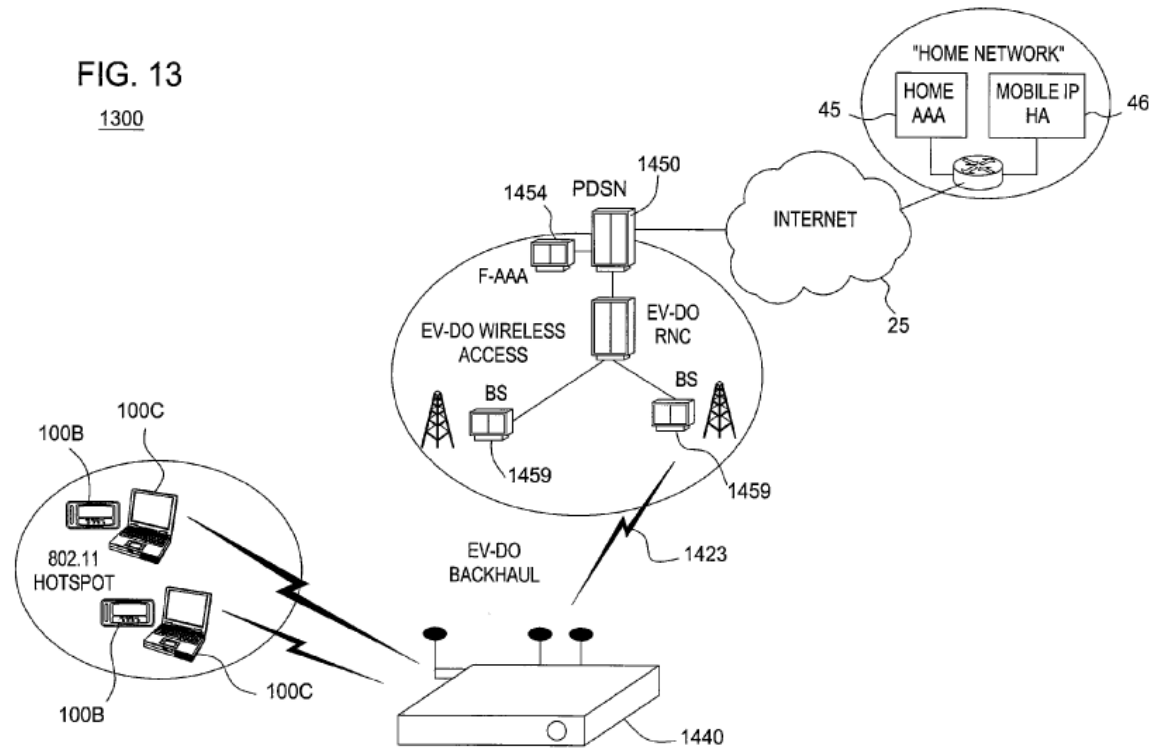
Petitioner contends claims 1–12, 14–22, 26–31, 34–37, 39, 40, 43, 47–53, 56–63, 65, and 66 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Buddhikot and Lord. Pet. 1, 19–63. Patent Owner presents arguments relating to these contentions. PO Resp. 15–48; PO Supp. Resp. 1–3.

1. Overview of Buddhikot

Buddhikot is titled, “Mobility Access Gateway” and describes a “MobileHotSpot Gateway,” which provides a user access to a network, and further describes home network support to allow an established user network session to continue without interruption as user’s device moves from connecting via a first network to connecting via a second network. Ex. 1006, Abstr., 4:17–34, 23:44–24:35.

⁷ The record contains no allegations or evidence of secondary considerations.

Figure 13 of Buddhikot, which illustrates a system including the MobileHotSpot Gateway, is reproduced below.



As shown above in Figure 13, Buddhikot discloses mobile nodes 100B and 100C connecting to MobileHotSpot Gateway 1440 via an 802.11 (wireless) network, to the Internet via backhaul link 1423 to base station 1459. *Id.* at 23:44–61, 24:4–8, 24:12–13. A home network with an authentication, authorization, and accounting (AAA) system, HOME AAA 45, provides user profile data and session state data for the users. *Id.*, Abstr., 10:3–43. In an exemplary embodiment, encryption of data traffic is not provided by the MobileHotSpot Gateway, but end-to-end privacy solutions for the traffic, such as Internet Protocol Security (“IP Sec”), may be used. *Id.* at 9:53–56, 17:45–50, 18:66–19:3.

2. Overview of Lord

Lord is titled, “Mobile Terminal and Method of Providing A Network-to-Network Connection” and describes a mobile terminal (MT) connecting a plurality of devices over a single wireless link. Ex. 1007, Abstr. Figure 1 of Lord, which illustrates a block diagram of a network according to the invention, is reproduced below.

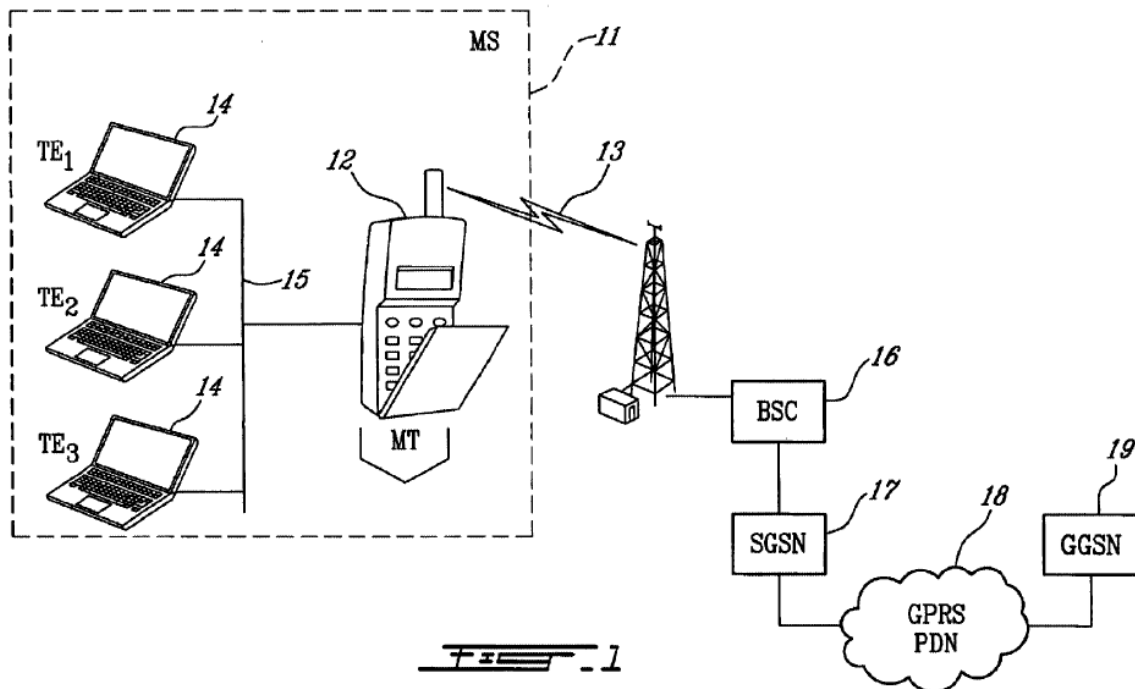


Figure 1 of Lord shows terminal equipment TE1, TE2, and TE3 14 connecting to network GPRS (general packet radio service) PDN (packet data network) 18 via mobile terminal 12. *Id.* at 1:10–11, 14, 3:16–25. The PDN may be the Internet. *Id.* at 3:19.

3. Combination of Buddhikot and Lord

Petitioner argues that one of ordinary skill in the art would have been motivated to combine Buddhikot’s teachings with those of Lord in order to use Lord’s detailed teachings of allocation of IP addresses with Buddhikot’s

teachings regarding security and authentication. Pet. 21–22. Petitioner supports its reasoning with the testimony of Dr. Lavian. See Ex. 1003 ¶¶ 225–229; Ex. 1043 ¶ 9.

Patent Owner argues that Petitioner presents no meaningful motivation to combine Buddhikot and Lord. PO Resp. 17–20. Patent Owner contends that Buddhikot uses different addressing schemes for the cellular and wireless networks, and so no need exists to use the addressing scheme disclosed by Lord, “because there exists no need to ensure that an IP address created downstream from Buddhikot’s gateway is distinct from the IP address assigned to the gateway itself.” PO Resp. 17. Patent Owner argues that a dynamic host configuration protocol (DHCP) server would not be necessary or present on the Buddhikot gateway as a centralized authentication and authorization system would be used. *Id.* However, as pointed out by Petitioner, such a server is present on Buddhikot’s gateway. Pet. Reply 6–7 (citing Ex. 1006, 24:36–40, 24:52–55); see Ex. 1003 ¶ 225 (cited at Pet. 23). Lord’s specification includes implementation details for an embodiment in which a DHCP server implemented in the mobile terminal assigns addresses to devices for uplink and downlink traffic. Ex. 1007, 3:43–56; 3:62–4:11, 5:5–13; Figs. 2, 3. We agree with Petitioner that the common DHCP functionality on their respective intermediary devices indicates that details on DHCP and address allocation in Lord would have been useful in Buddhikot and would have motivated an ordinarily skilled artisan to combine the references. Pet. 22; Pet. Reply 6–8.

Patent Owner additionally argues that Petitioner does not present evidence regarding how Buddhikot and Lord could be combined without undue experimentation. PO Resp. 20–21. Under *KSR*, “[a] person of

ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421 (2007). An obviousness determination is not limited to instances where the person of ordinary skill already well knows how to combine the specific references or has a document that plainly describes how to do so. The references can be considered together with the knowledge of ordinarily skilled artisans. *In re Paulsen*, 30 F.3d 1475, 1480–81 (Fed. Cir. 1994). Cited references, therefore, do not have to explain every detail to render a claimed invention obvious because the references speak to those skilled in the art. *Id.* at 1480. Petitioner presents evidence that Buddhikot and Lord each provide a “similar hot-spot architecture” and that the disclosures are “compatible,” including similar methods for assigning IP addresses to connected client devices. Pet. 23 (citing Ex. 1003 ¶¶ 225, 227–228). We determine that one of ordinary skill in the art would have predictably applied that knowledge in considering the combination of the prior art. See Ex. 1003 ¶¶ 225, 227–228.

Based on the record developed during trial, we are persuaded that Petitioner’s evidence and analysis establishes that the asserted combination is proper.

4. *Analysis of Asserted Obviousness over Buddhikot and Lord*

a. *Alleged Obviousness of Claims 16 and 43*

Petitioner maps the limitations of independent claim 16 to a combination of Buddhikot and Lord, and contends that claim 16 is unpatentable over this combination. Pet. 24–43, 52–54. Patent Owner presents a number of arguments alleging deficiencies in Petitioner’s argument that the proposed combination of the prior art renders the claim

obvious. PO Resp. 21–35. The parties argue claim 43 by reference to claim 16. Pet. 59–60; PO Resp. 45.

We address the arguments regarding the disputed claim limitations of claim 16 in turn.

- (1) *“a proxy server . . .” and a first computing device adapted to “tunnel data traffic from the second computing device . . . to the proxy server” and “a first computing device . . . adapted to . . . tunnel data traffic from the second computing device, through the first computing device, through the first AP, through the IP network, to the proxy server, wherein the proxy server acts as a proxy of the second computing device . . .”*

The system of claim 16 includes “a proxy server connected to the IP based network and adapted to act as a proxy of at least a subset of computing devices that connect via the wireless AP.” Additionally, the system of claim 16 includes a first computing device adapted, *inter alia*, to “tunnel data traffic from the second computing device, through the first computing device, through the first AP, through the IP network, to the proxy server, wherein the proxy server acts as a proxy of the second computing device and the data traffic is secure from the first computing device.”

Petitioner cites Buddhikot’s discussion of a proxy connecting a mobile user to a VPN and contends one of ordinary skill would have understood that a VPN gateway would connect to the IP based network, and that the mobile user’s node would connect to that VPN gateway via Buddhikot’s MobileHotSpot Gateway. Pet. 37–40, 52–53 (citing Ex. 1002, 17:44–50, 18:66–19:3; Ex. 1003 ¶ 263); see Pet. Reply 9–14. According to Petitioner, one of ordinary skill would have understood that a VPN gateway,

such as Buddhikot's proxy device, would be provided as an entry point to a VPN to allow the mobile user to connect to the VPN. Pet. 38–39; Pet Reply 11–13; Tr. 10:10–11:8. Petitioner cites to Dr. Lavian's declaration describing the use of VPN to allow a user to work on a private network, for example to allow an employee to access a corporate network as if the employee's device was on site. Pet. Reply 13 (citing Ex. 1043 ¶¶ 21–22). Petitioner also discusses Buddhikot's suggestion that IPSec, which establishes a secure tunnel to an endpoint gateway, may be used to secure traffic through the MobileHotSpot Gateway. Pet. at 37–39; Ex. 1003 ¶ 127.

Petitioner also contends that the “adapted . . . to tunnel” limitation is taught or suggested by Buddhikot. Pet. 37–43, 53–54. Petitioner argues that Buddhikot teaches this in Buddhikot's gateway's tunneling of data traffic with IPSec, using its first AP from the mobile node (second computing device) through the IP network, to an end-point. *Id.* at 37–38, 53 (citing Ex. 1003 ¶ 263; Ex. 1006, 17:44–50, 18:66–19:3). Petitioner additionally argues Buddhikot teaches IPSec/VPN as providing “end-to-end privacy” in which tunneled data traffic is secure from the gateway. *Id.* at 39 (citing Ex. 1003 ¶ 264; Ex. 1006, 9:53–58, 17:44–50, 18:66–19:3). Petitioner specifically notes that a block diagram of a client in Buddhikot (a mobile node / “second computing device”) includes VPN/IPSec control 1216 and VPN/IPSec client driver 1234. *Id.* at 39–40 (citing Ex. 1006, 4:9–10, 18:66–19:3, Fig. 15). Thus, Petitioner argues, Buddhikot teaches a VPN/IPSec tunnel beginning at the client, providing end-to-end privacy for the client to a VPN gateway that provides access to a VPN. *Id.* at 38–40.

Patent Owner argues that neither of the two identified gateways — end-point IPSec gateway and VPN gateway — accept requests from and act

on behalf of a device, as per its urged construction of “proxy server,” which we have adopted *supra*. PO Resp. 22–24. Patent Owner argues, “a POSITA would understand that a proxy server and a VPN perform different roles” and that the ’306 patent itself shows this—as it discloses a VPN but “at no time [in the ’306 patent specification] is VPN capability conflated with a proxy function.” PO Resp. 25. Patent Owner argues that the discussion of the VPN in this section is specifically described as “another embodiment” from one which mentions the remote node as a “proxy” and does not itself describe the remote node as a proxy server. Pet. Supp. Resp. 1–2 (citing Ex. 1002, 15:14–19); *see also* Tr. 21:24–22:4. Patent Owner also argues that “a VPN gateway is still a gateway, and . . . a gateway is not a proxy server” and that “a POSITA would understand that a proxy server and a VPN perform different roles.” PO Resp. 24–26.

We disagree that the ’306 patent’s specification distinguishes between a remote node that is a trusted computer used to effect a VPN with a network, on the one hand, and a proxy on the other. The ’306 patent includes a section titled “Security” which deals with (a) internal security for the intermediary device, and (b) data security for a device connecting through the intermediary device. Ex. 1002, 14:34–15:42. The general description of the solution for the second security issue—data security for a connecting device—is the “tunneling [of] sensitive traffic to a trusted network site . . . which acts as a proxy of” the connecting device. Ex. 1002, 14:49–52. While different embodiments of this trusted network site are more specifically described, including the VPN embodiment (Ex. 1002, 15:1–19), we read each of these, including the VPN embodiment, as conforming to that general description.

Thus, we do not agree with Patent Owner that the '306 patent indicates that a remote node acting as a VPN gateway could not be a proxy server. Rather, we agree with Petitioner that Buddhikot teaches the use of VPN, and that a person of ordinary skill in the art at the time of the invention would have understood that a VPN gateway would exist for the connecting device at a tunnel endpoint, allowing it access to the VPN. *See* Pet. 38–40; Ex. 1003 ¶¶ 263–264; Ex. 1006, 9:53–58; 17:44–50, 18:66–19:3; Fig. 15. Based on this evidence, that VPN gateway would function as a proxy server—an intermediate server that accepts requests from the connecting device, e.g., for access to resources on the VPN, and acts on behalf of the connecting device in allowing the connecting device functionality in the VPN. *See* Ex. 1003 ¶ 265. Upon review of Petitioner’s evidence and analysis, and taking into account Patent Owner’s arguments, we determine the combination of Buddhikot and Lord teaches the proxy server claim limitation.

With respect to the “adapted to . . . tunnel data traffic . . . to the proxy server” limitation, Patent Owner reiterates its stance that the end-point in Buddhikot is a gateway, simply “an entrance and exit into a communications network” and not a proxy, in that it does not accept requests from and act on behalf of a device. PO Resp. 33. As discussed above, contrary to Patent Owner’s contention, Buddhikot teaches a proxy. Upon review of Petitioner’s evidence and analysis, and taking into account Patent Owner’s arguments, we determine that Buddhikot teaches the “adapted to . . . tunnel data traffic . . . to the proxy server” claim limitation as well.

(2) “a first computing device having a user interface . . .” and “adapted to . . . enable a user of the first computing device to interact, through the user interface . . .”

The system of claim 16 includes “a first computing device having a user interface, wherein the first computing device is adapted to . . . enable a user of the first computing device to interact, through the user interface, with destinations over the IP based network, through the first wireless AP, using a first public IP address associated with the first computing device.”

With respect to this claim limitation, Petitioner notes that the MobileHotSpot Gateway in Buddhikot has a public IP address, and interacts with the Internet via the base station 1459 as discussed *supra*, Section II.D.1. Pet. 31–32. Petitioner indicates that Buddhikot does not disclose a user interface in its MobileHotSpot Gateway. *Id.* at 32. Petitioner’s argument regarding the MobileHotSpot Gateway’s use of Linux (*id.* at 32–33) is unpersuasive. Although some Linux implementations may offer user interfaces, not all Linux implementations do. *See* PO Resp. 27–28 (citing Ex. 2005).

However, Petitioner additionally notes that Lord discloses an Internet-connected mobile terminal, which can be a cellular phone, and that such phones provide a user interface. Pet. 33–34 (citing Ex. 1003 ¶¶ 204, 253–254); Pet. Reply 14–15 (citing Ex. 1043 ¶ 33). We agree that Lord’s mobile terminal, to one of ordinary skill in the art, would have taught or suggested the claimed interface and display.

Patent Owner argues that the user interface and display must be adapted to allow a user of said computing device to interact with destinations over the IP based network, and that cellular phone user

interfaces instead “were initially provided to facilitate the initiation and receipt of telephone calls.” PO Resp. 30. Although this may be true, we credit the uncontroverted testimony of Petitioner’s declarant that “[t]he point of having the Internet on a phone is to allow users to access the Internet” (Ex. 1043 ¶ 33), and additionally note that Lord describes its mobile terminal as “implement[ing] the normal [cellular packet data network] protocols for connection to the [packet data network]” (Ex. 1007, 3:45–46; *see also id.* at 1:33–38). This “normal” functionality in Lord appears to imply an interface for more than initiation and receipt of telephone calls.

Patent Owner additionally argues that Petitioner presents no reason or motivation for selecting Lord’s mobile terminal over other choices presented by Petitioner, such as a Linux GUI. PO Resp. 31–32. Thus, Patent Owner argues, since the Decision to Institute finds the claimed combination of Lord and Buddhikot teaches the user interface in the system of claim 16, Petitioner must show why a person of ordinary skill would have chosen Lord’s user interface over the other discussed options. *Id.* Regardless of whether Linux teaches the claimed interface, we are persuaded by Petitioner’s evidence that Lord teaches the claimed interface. In light of this evidence, we do not agree that Petitioner must establish that an ordinarily skilled artisan would have chosen Lord over Linux. We additionally note that at least some Linux implementations utilize a user interface (Ex. 1003 ¶¶ 251–252), so Petitioner’s citations to Linux are not inconsistent with its unpatentability contentions. Thus, upon review of Petitioner’s evidence and analysis, and taking into account Patent Owner’s arguments, we determine the combination of Buddhikot and Lord teaches the claimed user interface.

(3) “a first computing device . . . adapted to”
“provide a second computing device . . . with
access to the IP based network by causing
the first computing device to serve . . . as a
second AP having a second APID, distinct
from the first APID, and provide the second
computing device access to the IP based
network via the first AP”

According to claim 16, the first computing device is also adapted to
“provide a second computing device of the other wireless enabled
computing devices with access to the IP based network by causing the first
computing device to serve the second computing device as a second AP
having a second APID, distinct from the first APID, and provide the second
computing device access to the IP based network via the first AP.”

Petitioner argues that Buddhikot’s MobileHotSpot Gateway functions
as an 802.11 access point for mobile devices and provides Internet access via
the cellular base station (i.e., “the first AP”). Pet. 35–36, 52–53. Petitioner
argues that the MobileHotSpot Gateway access point teaches or suggests the
claimed second AP, and that the service set identifier (SSID)⁸ of the 802.11
access point taught by Buddhikot is the second APID. *Id.*

We agree with Petitioner. Buddhikot shows that the MobileHotSpot
Gateway includes an 802.11 access point, and through that access point
provides access to Internet 25 via base station 1459. See Pet. 34–36 (citing,
intra alia, Ex. 1006, 23:46–61, 23:66–24:13, Figs. 13, 14).

Patent Owner argues that, although claim 16 requires that the APID of
the first access point and the APID of the second access point be distinct,

⁸ See Ex. 1002, 7:62; see also Ex. 1003 ¶ 136 (expanding the acronym as
“service set identifie[r]”).

“Petitioner fails to explain how the computing device ensures that the second APID is distinct from the first APID.” PO Resp. 32–33. We agree with Patent Owner that the Petition does not show that the device of Buddhikot would *ensure* that a first APID would be different from a second APID. However, we note Petitioner’s argument is that the first access point of Buddhikot is a cellular base station with a unique cell ID (first APID) and that the AP of the gateway 1440 would be an 802.11 access point with an associated SSID, which would be an alphanumeric identifier used to identify a Wi-Fi access point. Pet. 26–27, 35–36; Ex. 1003 ¶¶ 241, 259. We credit Dr. Lavian’s testimony that one of ordinary skill in the art would have expected a cellular base station cell ID and an 802.11 access point SSID to be distinct (Ex. 1003 ¶ 259), even if no specific functionality ensures this differentiation.

Upon review of Petitioner’s evidence and analysis, and taking into account Patent Owner’s arguments, we determine that Buddhikot teaches the “provide a second computing device . . . with access to the IP based network . . .” claim limitation.

(4) *“the second computing device operates on the IP based network using a second public IP address distinct from the first public IP address . . .”*

According to claim 16, “the second computing device operates on the IP based network using a second public IP address distinct from the first public IP address, with the second public IP address associated with the second computing device.” Petitioner argues that Buddhikot teaches this limitation. Pet. 40–42, 54.

Petitioner argues that Buddhikot discloses the MobileHotSpot Gateway system in both a Mobile IP and a Simple IP embodiment. *Id.* at 40. Specifically, Petitioner argues that under Mobile IP, the mobile node (second computing device) retains a fixed public IP address obtained from a DHCP server in a home network. *Id.* at 40–41 (citing Ex. 1003 ¶ 268). Data responsive to requests sent from that fixed public IP address is sent to the fixed public IP address, and thus received by the home network, after which it is forwarded (via the MobileHotSpot Gateway) to the mobile node using the MobileHotSpot Gateway and a related IP address (first public IP address). *Id.* at 41 (citing Ex. 1006, 14:54–56; Ex. 1003 ¶ 268). Petitioner contends that, because the address used for the mobile node (“second public IP address”) is forwarded to the MobileHotSpot Gateway (with a “first public IP address”), these two addresses would need to be distinct in the Mobile IP embodiment. Pet. 41 (citing Ex. 1003 ¶ 268).

Petitioner also argues that the limitation is taught in the Simple IP embodiment, in which a client obtains an IP address through DHCP server 232 implemented in the MobileHotSpot Gateway. Pet. 41 (citing Ex. 1006, 16:38–39; Ex. 1003 ¶ 269); *see also* Ex. 1006, 16:36–38. Petitioner contends, and we agree, that one of ordinary skill in the art would have expected the client IP address assigned by the MobileHotSpot Gateway to be distinct from the IP address assigned to the MobileHotSpot Gateway. Pet. 41–42 (citing Ex. 1003 ¶ 269).

Patent Owner appears to agree that Buddhikot’s MobileHotSpot Gateway and connecting devices have associated IP addresses as in this claim limitation. PO Resp. 34–35. Patent Owner contends, “Petitioner describes embodiments where the IP addresses may be distinct, but nothing

in the references discloses that they are distinct.” *Id.* at 35. However, as stated above, we agree with Petitioner that, at least in some embodiments, Buddhikot teaches distinct IP addresses for the MobileHotSpot Gateway and mobile devices connecting to a network through the MobileHotSpot Gateway. *See* Ex. 1006, 16:38–39; Ex. 1003 ¶ 269.

Upon review of Petitioner’s evidence and analysis, and taking into account Patent Owner’s arguments, we determine that Buddhikot teaches the operation of a second computing device on the IP based network using a second, distinct public IP address as per this claim limitation.

(5) Conclusion

As to the other limitations of claim 16 under this ground, Patent Owner presents no additional arguments. We have reviewed the evidence and arguments presented in the Petition and determine that Petitioner has established that the combination of Buddhikot and Lord teaches the remaining limitations in claim 16. For the first wireless access point of the system and the wireless connection of the first computing device through that access point, Buddhikot teaches a base station 1459 providing the gateway 1440 with access to the Internet. Ex. 1006, 23:44–24:18, Fig. 13. For the first computing device wirelessly communicating with other wireless enabled computing devices, Buddhikot teaches the gateway 1440 communicating with mobile nodes 100a–100c. Ex. 1006, 7:20–30; Figs. 1, 13.

For the reasons discussed above, we determine Petitioner has shown by a preponderance of the evidence that claims 16 and 43 are unpatentable as obvious over Buddhikot and Lord.

b. Alleged Obviousness of Claim 1

With respect to the obviousness of claim 1, Petitioner maps the limitations of independent claim 1 to a combination of Buddhikot and Lord, and contends that claim 1 is unpatentable over this combination. Pet. 24–43. Claim 16 was addressed in the Petition mainly with respect to claim 1. See Pet. 52–54. After the modification of the institution, Patent Owner responded to claim 1 arguments and evidence presented in the Petition in its Patent Owner Supplemental Response, incorporating arguments from the Patent Owner Response and providing additional argument relating to the construction of “proxy server,” each of which we have addressed. PO Supp. Resp. 1–3; *see supra* § II.B.2; § II.D.4.a.

Petitioner argues that the wireless access point 1445 and the wireless modem 1435 in Buddhikot’s MobileHotSpot gateway 1440 teach the “communication module” limitation of claim 1. Pet. 25–31; Pet. Supp. Reply 6; Tr. 8:22–9:9. Patent Owner argues that Buddhikot and Lord fail to teach or suggest the claimed “communication module” limitation of claim 1 under Patent Owner’s proposed construction of this term. PO Supp. Resp. 1. As discussed above, however, we modify our construction of this term such that two wireless network cards may be an equivalent of the corresponding structure for this term, namely, a wireless network card. *See supra* § II.B.1. At the oral hearing, Patent Owner conceded that Buddhikot discloses a two-card communication module. Tr. 29:14–30:6. Thus, we determine that the combination of Buddhikot and Lord teaches the “communication module” limitation of claim 1. Patent Owner does not raise any additional issues separate from those discussed above with respect to claim 16.

On the entire trial record, Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable over Buddhikot and Lord.

c. Alleged Obviousness of Claims 10, 21, and 58

Claim 21 depends from claim 16 and additionally recites that the first computing device is further adapted to “prevent data packets destined for the user interface from being accessed by the second computing device.”

Claims 10 and 58 recite substantially similar limitations. We discuss claim 21 as representative. *See* Pet. 56, 62; PO Resp. 37; PO Supp. Resp. 1.

Petitioner contends that claim 21 is unpatentable under 35 U.S.C. § 103 over Buddhikot and Lord. Pet. 48, 56. Petitioner cites Lord’s teachings that the mobile terminal (serving as second AP) and the terminal equipment that connect to the IP based network through the mobile terminal are each provided unique public IP addresses. Pet. 48 (citing Ex. 1007, 4:41–51). Petitioner additionally notes that a basic property of packet-routing would be that packets directed to one IP address would not be forwarded beyond the device associated with that IP address. Pet. 48 (citing Ex. 1003 ¶ 296).

Upon review of Petitioner’s evidence and analysis, and taking into account Patent Owner’s arguments, discussed below, we agree with Petitioner that packets in a packet network system that are directed to a device with an IP address generally would not be forwarded on to other devices after arriving at their addressed destination. *Id.* Thus, in the system of Lord, packets addressed to the mobile terminal, for the user interface of that mobile terminal, would not be accessed by the second computing device (“terminal equipment” in Lord), and only packets addressed to specific

terminal equipment are delivered to that terminal equipment. *See* Ex. 1007, 5:8–13.

In light of Petitioner’s argument that Buddhikot’s gateway may be accessed via a remote display, Patent Owner contends Petitioner has admitted that Buddhikot does not prevent the gateway’s user interface and display from being accessed by devices such as the claimed second computing device. PO Resp. 37 (citing Pet. 15). As such, Patent Owner asks us to consider every device connected to the gateway, such as a remote interface and display, to necessarily be a “second computing device” as per the limitations of claim 21. But claim 21 requires only the first computing device to prevent access of data packets by *one* of the “other wireless enabled computing devices,” i.e., the “second computing device.” Petitioner need not establish that the first computing device prevents access of data packets by all of the “other wireless enabled computing devices.” *See* Ex. 1002, 33:48–54.

On the entire trial record, we determine Petitioner has shown by a preponderance of the evidence that claims 10, 21, and 58 are unpatentable as obvious over Buddhikot and Lord.

d. Alleged Obviousness of Claim 11, 22, and 59

Claim 22 depends from claim 16 and additionally recites that the first computing device is further adapted to “to disconnect the second computing device from the second AP after a predetermined period.” Claims 11 and 59 recite substantially similar limitations, and we discuss claim 22 as representative. *See* Pet. 56, 62; PO Resp. 47; PO Supp. Resp. 1.

Petitioner contends that claim 22 is unpatentable under 35 U.S.C. § 103 over Buddhikot and Lord. Pet. 49, 56. Petitioner argues that in

Buddhikot, “time and duration data” for user sessions can be obtained and “time-based” pricing is discussed. *Id.* at 49 (citing Ex. 1006, 13:65–14:10); Pet. Reply 20. Petitioner further argues, citing Dr. Lavian’s declaration, that with such pricing, one of ordinary skill would have found it obvious “that after the time period, the user would be disconnected from the Internet by the MobileHotSpot Gateway.” Pet. 49 (citing Ex. 1003 ¶ 298). Patent Owner argues that “Petitioner does not (and cannot) point to a disclosure or suggestion in Buddhikot that causes a disconnection of a given device after a predetermined time period.” PO Resp. 38. Dr. Lavian’s testimony, which we credit, stands unrebutted and establishes that an ordinarily skilled artisan considering Buddhikot’s “time and duration data” and “time-based” pricing would have known to disconnect a user from an Internet gateway after a certain time. *See* Ex. 1003 ¶ 298.

On the entire trial record, we determine Petitioner has shown by a preponderance of the evidence that claims 11, 22, and 59 are unpatentable as obvious over Buddhikot and Lord.

e. Alleged Obviousness of Claim 3, 26, and 48

Claim 26 depends from claim 16 and additionally recites that the first computing device’s adaptation to tunnel data traffic is further performed “in response to at least activating data service for the second computing device through a captive portal web interface.” Claims 3 and 48 recite substantially similar limitations, and we discuss claim 26 as representative. *See* Pet. 56, 60; PO Resp. 46; PO Supp. Resp. 1.

Petitioner contends that claim 26’s additional limitation is taught in Buddhikot’s Simple IP embodiment, in which a log in is required for a client device, and in which a log in process includes the redirection of the client

(second computing device) to a local authentication page. *Id.* at 45–46 (citing Ex. 1006, 16:25–29, 34–52, Fig. 2). Petitioner explains that the specific figures for gateways 40 and 1440 include web services with a local portal. *Id.* at 46 (citing Ex. 1006, Fig. 2 (element 213), Fig. 14 (element 1413)). Patent Owner argues that as Buddhikot teaches that Simple IP authentication occurs “by means of the AAA server 204,” Buddhikot does not teach activating data service “through a captive portal web interface.” PO Resp. 38–39 (citing Ex. 1006, 16:42–44).

We do not agree with Patent Owner. The ’306 patent describes a captive portal as a web interface to which a user’s web browser is forwarded for authentication. Ex. 1002, 3:40–59. In Buddhikot, authentication by the AAA server 204 begins when the user is redirected to a local authentication page. Ex. 1006, 16:38–42. Buddhikot’s element 213 in Figure 2, labeled “local portal,” is also referred to as the “web-based authentication system.” Ex. 1006, Fig. 2 (element 213), 16:36–38; *see* Pet. 45–46. In this local portal, Buddhikot teaches the claimed captive portal through which data service is activated after authentication.

We agree that Petitioner has shown by a preponderance of the evidence that claims 3, 26, and 48 are unpatentable as obvious over Buddhikot and Lord.

f. Alleged Obviousness of Claims 6, 29, and 51

Claim 29 depends from claim 16 and additionally requires that that “the second AP is controlled, at least in part, by a network entity in a cellular system.” Claims 6 and 51 recite substantially similar limitations, and we discuss claim 29 as representative. *See* Pet. 47, 57, 61; PO Resp. 61; PO Supp. Resp. 1.

Petitioner argues that Buddhikot teaches this limitation because the MobileHotSpot Gateway would be controlled by a network provider, and because a network entity in the cellular system—“the Authentication, Authorization and Accounting (AAA) server of the 3G carrier”—would authenticate and authorize users. Pet. 47, 57 (quoting Ex. 1006, 4:42–49). Petitioner further cites Dr. Lavian’s testimony that one of ordinary skill would understand that the MobileHotSpot Gateway would be controlled by a network provider, which would be a network entity in a cellular system. Pet. 47 (citing Ex. 1003 ¶¶ 287–288).

Patent Owner argues, “Petitioner does not explain how Buddhikot’s MobileHotSpot Gateway 1440 is in any way controlled by the AAA server of the 3G carrier. Indeed, there is no suggestion that Buddhikot’s MobileHotSpot Gateway 1440 is controlled by *any* outside entity.” PO Resp. 39. We, however, agree that Petitioner’s citations to Buddhikot and Dr. Lavian’s testimony establish that the authorization of a user and other data from the AAA server at least in part controls the actions of the second AP in the MobileHotSpot Gateway. See Ex. 1006, 4:40–43, 9:50–52; Ex. 1003 ¶¶ 287–288. Buddhikot also teaches that service policies could be dynamically obtained by a gateway from a home network AAA server, and then enforced by the gateway on the wireless network. Ex. 1006, 6:34–45 (cited at Pet. 32.)

On the entire trial record, Petitioner has shown by a preponderance of the evidence that claims 6, 29, and 51 are unpatentable as obvious over Buddhikot and Lord.

g. Alleged Obviousness of Claims 34 and 60

Claim 34 depends from claim 16 and additionally requires that “the tunneled data traffic includes data packets for use in conducting a[n] IP based phone call.”

Claim 60 recites substantially similar limitations, and we discuss claim 34 as representative. *See* Pet. 57; PO Resp. 47.

Petitioner argues that Buddhikot teaches the limitation of claim 34 in the disclosure that network sessions include voice chat. Pet. 57 (citing Ex. 1006, 4:35–64). With reference to Buddhikot’s Figure 1, Patent Owner argues that such voice chat would not be transmitted to the proxy server, but rather would be sent only to the 3G network. PO Resp. 40. We do not see Figure 1 as indicating that any or all voice data from devices using the second AP must terminate in a cellular call transmitted via the 3G network. Rather, we agree with Petitioner that a client device may connect via a wireless connection. Pet. Reply. 20–21. In fact, the portion of Buddhikot that describes voice chat relates to the transparent “switching” that is desired, and states that switching relates to the described seamless switching from wireless (802.11) to 3G access and vice versa. Ex. 1006, 4:29–34. Buddhikot, thus, does not disclose that voice chat would be sent only via a 3G network.

On the entire trial record, Petitioner has shown by a preponderance of the evidence that claims 34 and 60 are unpatentable as obvious over Buddhikot and Lord.

h. Alleged Obviousness of Claim 12, 37, and 63

Claim 37 depends from claim 16 and additionally requires that “the second public IP address is shared by the second computing device with at

least one other device of the other wireless enabled computing devices.” Claims 12 and 63 recite substantially similar limitations, and we discuss claim 37 as representative. *See* Pet. 58, 63; PO Resp. 48; PO Supp. Resp. 1.

Petitioner cites Buddhikot’s network address translation (NAT) implementation and argues that in the Simple IP embodiment, the disclosed gateway would support private addressing using NAT, which would allow different connecting devices to share a single IP address. Pet. 49, 58 (citing, *intra alia*, Ex. 1006, 16:50–53; Ex. 1003 ¶ 301). Additionally, Petitioner argues that in the Mobile IP embodiments, a person of ordinary skill would have found it obvious to use a NAT at the home network, which would allow more than one of a user’s devices to share the same IP address. Pet. 50 (citing Ex. 1003 ¶ 301).

Patent Owner argues that Petitioner’s reading of an implementation of NAT in Buddhikot is flawed, because claim 16 requires the first public IP address (which in Buddhikot would be the IP address of the MobileHotSpot Gateway) and the second IP address (which would be the address of the second computing device such as user device 100) to be different. PO Resp. 42–43. Patent Owner argues that “Petitioner does not explain how Buddhikot’s MobileHotSpot Gateway 1440 discloses or suggests the use of a single IP address for the Wi-Fi connected devices that is different from the IP address used by the gateway itself.” *Id.* at 43. Nonetheless, this argument is not commensurate with the claim limitation, which describes multiple wireless enabled computing devices (not the “first computing device,” which Petitioner argues corresponds to Buddhikot’s gateway) sharing one IP address.

On the entire trial record, Petitioner has shown by a preponderance of the evidence that claims 12, 37, and 63 are unpatentable as obvious over Buddhikot and Lord.

i. Alleged Obviousness of Claims 14, 15, 39, 40, 65, and 66

Claim 39 depends from claim 16 and additionally requires that “the first computing device is adapted to prevent the second computing device from accessing internal IP addresses associated with the first computing device.” Claims 14 and 65 recite substantially similar further limitations to the claims from which they depend. Claim 40 depends from claim 16 and adds the requirement that “the first computing device is adapted to restrict the second computing device from accessing a predetermined set of IP addresses.” Claims 15 and 66 recite substantially similar further limitations to the claims from which they depend. We discuss claims 14 and 15 as representative of these claims. *See* Pet. 59, 63; PO Resp. 48; PO Supp. Resp. 1.

With respect to claim 14, Petitioner argues that Buddhikot teaches a dynamic firewall protecting the gateway and connected devices from malicious access by client devices. Pet. 50–51, 59 (citing Ex. 1006, 10:55–59, 11:4–8). Petitioner additionally notes that Lord discloses separate logical connections and IP addresses for each connected device, which, according to Dr. Lavian, would have taught or suggested to one of ordinary skill that a firewall might be employed. *Id.* at 51 (citing Ex. 1007, 2:33–39, 3:57–60; Ex. 1003 ¶ 304). In addition, Petitioner notes that one of ordinary skill in the art would have expected a public Wi-Fi connection to include security measures separating device traffic and “prevent[ing] other . . .

connected users from accessing [a user's] laptop.” *Id.* at 51 (citing Ex. 1003 ¶ 305). With respect to claim 15, Petitioner argues that one of ordinary skill would have restricted a connected device from accessing restricted addresses subject to the restrictions of the dynamic firewall. *Id.* at 52, 59 (citing Ex. 1003 ¶ 305).

Patent Owner notes that certain of the relied-upon teachings of Buddhikot relate to Buddhikot's gateway 40 embodiment and others to the MobileHotSpot Gateway 1440 embodiment. PO Resp. 43–44. Buddhikot, however, specifically teaches that the MobileHotSpot embodiment incorporates features of the other disclosed gateways, and one of ordinary skill in the art would have understood that “[s]ome embodiments of the exemplary gateway 1440 include several functions that are the same as or similar to those in the gateway 40 of FIGS. 1 and 2, including . . . security/accounting functions” Ex. 1006, 24:20–26; Pet. Reply 21–22 (citing, *inter alia*, Ex. 1006, 24:36–40, 24:52–53; Ex. 1043 ¶ 34).

On the entire trial record, Petitioner has shown by a preponderance of the evidence that claims 14, 15, 39, 40, 65, and 66 are unpatentable over Buddhikot and Lord.

j. *Alleged Obviousness of Claims 4, 5, 7–9, 17, 19, 27, 28, 30, 31, 35, 36, 49, 50, 52, 53, 56, 61, and 62*

With respect to claims 4, 5, 7–9, 17, 19, 27, 28, 30, 31, 35, 36, 49, 50, 52, 53, 56, 61, and 62, with a complete record before us, we note that we have reviewed the arguments and evidence advanced by Petitioner to support its unpatentability contentions. *See* Pet. 43–48, 54–58, 60–63. For these claims, Patent Owner chose not to address certain limitations in its

Patent Owner Response, repeated arguments addressed above (e.g., the alleged lack of a teaching or suggestion of a proxy server in Buddhikot), or made only general allegations that Petitioner has not explained or has not adequately explained the teachings with respect to added limitations. See PO Resp. 35–37, 39, 41–42, 46, 47; PO Supp. Resp. 1 (incorporating by reference all arguments from Patent Owner’s Preliminary Response regarding these claims).

For claims 4, 5, 27, 28, 49, and 50, which variously require the first AP to be a cellular cell, included in a cellular telephone network, or included in a terrestrial wireless network, Petitioner persuasively cites Buddhikot’s teaching that the access point providing Internet access to the gateway in one embodiment is a wireless cellular base station and Dr. Lavian’s testimony concerning “cellular cell” and “terrestrial wireless network.” Pet. 46, 56–57, 61 (citing Ex. 1006, 4:42–49, 23:44–24:18, Fig. 13; Ex. 1003 ¶¶ 285, 287–288, 292).

For claims 7, 8, 30, 31, 52, and 53, concerning the wireless communication protocols, Petitioner persuasively cites Buddhikot’s teaching that the base station (first access point) is part of a 3G network and the gateway provides an 802.11 access point. Pet. 47, 57, 61 (citing Ex. 1006, 23:44–24:18; Ex. 1003 ¶¶ 290, 292).

For claims 9, 19, and 56, concerning the proxy server acting as a proxy interacting with destinations over the IP network, Petitioner persuasively cites Buddhikot’s teaching that the tunnel end point (e.g., VPN gateway) serves as a proxy for a mobile user to access an IP network and refers to its arguments relating to the proxy server limitation of claim 1 and the provision of end-to-end privacy solutions, which one of ordinary skill in

the art would have known to commonly provide access to a VPN and the Internet. Pet. 37–40, 48 (citing Ex. 1006, 17:44–50, 18:66–19:3; Ex. 1003 ¶¶ 263–265, 294).

For claim 17, concerning a third computing device of the other wireless enabled computing devices being provided access and tunneling of data traffic by the first computing device, Petitioner persuasively cites Buddhikot and Lord’s teaching of provision of access for multiple clients. Pet. 54 (citing Ex. 1006 Fig. 13; Ex. 1007 Fig. 1; Ex. 1003 ¶ 325).

For claims 35, 36, 61, and 62, concerning the content in the data tunneled to the proxy server or received from the proxy server, Petitioner persuasively cites Buddhikot’s teaching of voice chat (Ex. 1006, 4:45) and Dr. Lavian’s testimony regarding what one of ordinary skill in the art would have known (Ex. 1003 ¶¶ 354, 355). Pet. 58, 62–63.

In this regard, the record now contains persuasive, un rebutted arguments and evidence presented by Petitioner regarding the manner in which the asserted prior art teaches the limitations of claims 4, 5, 7–9, 17, 19, 27, 28, 30, 31, 35, 36, 49, 50, 52, 53, 56, 61, and 62. Based on the preponderance of the evidence before us, we conclude that the prior art identified by Petitioner discloses, teaches, or suggests all limitations of these claims.

k. Alleged Obviousness of Claims 2, 18, and 47

Claim 2 depends from claim 1 and requires that “the second APID is associated with the proxy server.” Claims 18 and 47 recite substantially similar limitations, and we discuss claim 2 as representative. See Pet. 55, 60; PO Resp. 37, 43; Pet. Supp. Reply 10.

Petitioner argues that the association between the second APID and the proxy server may be a weak association, meaning that “the proxy server does not have to be the same device that provides the second AP.” Pet. 43–44 (citing Ex. 1003 ¶ 276). Petitioner argues only that the APID for the gateway is associated with the proxy server “because it is a point along the client-to-proxy tunnel, and because the client must necessarily connect to the MobileHotSpot Gateway’s SSID (*second APID*) before connecting to the tunnel gateway.” *Id.* at 44 (citing Ex. 1003 ¶ 277); Pet. Supp. Reply 10. Thus, Petitioner relies on the network pathway to establish the recited association.

Although the Buddhikot gateway provides the access to the IP network to the mobile user and tunnels data, Petitioner provides no evidence that the gateway (and the APID it provides) is associated with the proxy server. Any such association would be so weak as to be meaningless. Petitioner’s alleged connection occurring “necessarily” through one specific access point (a specific gateway) is belied by Buddhikot’s teaching that other client-to-proxy tunnels could easily be created, e.g., if the mobile user left the range of the Buddhikot gateway and connected via a different network connection or a different gateway. Ex. 1006, 4:29–34.

Thus, we find that the association of the second APID with the proxy server in Buddhikot is not supported by a preponderance of the evidence. On the entire trial record, Petitioner has not shown by a preponderance of the evidence that claims 2, 18, and 47 are unpatentable over Buddhikot and Lord.

l. Alleged Obviousness of Claims 20 and 57

Claim 20 depends from claim 16 and requires that “the second computing device connects to the IP based network through a third AP having a third APID, distinct from the first APID and the second APID, concurrently with connecting to the IP based network through the second AP.” Claim 57 recites substantially similar limitations, and we discuss claim 20 as representative. *See* Pet. 62; Pet. Supp. Resp. 1 n.1; PO Supp. Resp. 3.

Petitioner argues that the concurrent connection of the second computing device to the IP based network through a second AP and a third AP is shown in Buddhikot in the discussion of a client choosing between wireless networks. Pet. 55 (citing Ex. 1006, 20:48–52). Although Buddhikot describes how a client selects an interface using the “interface selection algorithm,” Buddhikot does not discuss concurrent connection via more than one interface. Ex. 1006, 20:48–21:32.

Additionally, Petitioner argues that multi-interface mobility client driver 1230 disclosed in Buddhikot intercepts packets and determines which interface to use. Pet. 55–56. However, Buddhikot does not teach choosing between two concurrently connected interfaces of the same type; rather, Buddhikot discloses the use of a new interface (e.g., Ethernet or 3G) when, for example, the connection via Wi-Fi interface 1240 is lost. Ex. 1006, 19:36–59. Thus, we are not persuaded that Buddhikot teaches the limitations in claims 20 and 57.

On the entire trial record, Petitioner has not shown by a preponderance of the evidence that claims 20 and 57 are unpatentable over Buddhikot and Lord.

E. Asserted Obviousness over Buddhikot, Lord, and Moran

Petitioner contends claims 23–25, 41, 42, 44–46, 67, and 68 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Buddhikot, Lord, and Moran. Pet. 1, 63–71. Patent Owner presents arguments relating to these contentions. PO Resp. 48–56.

1. *Overview of Moran*

Moran is titled, “Device to Facilitate the Deployment of Mobile Virtual Private Networks for Medium/Large Corporate Networks.” Ex. 1010, [54]. Moran describes a Transfer Home Agent (T-HA), which deploys in an enterprise network (such as a corporate intranet), and at the same time connects to the Internet so user device may remotely connect to the enterprise network via the T-HA. Ex. 1010, 6:13–31. The remote user and T-HA communicate via an IPSec tunnel. *Id.* The T-HA can provide authentication functionality, assignment of an internal home agent, termination of IPSec VPN connectivity, decryption and decapsulation of traffic, IP encapsulation of traffic to tunnel towards in internal home agent, assignment of a new T-HA, and traffic-based accounting. *Id.* at 8:22–10:2; 11:17–26.

2. *Combination of Buddhikot, Lord, and Moran*

Petitioner argues that one of ordinary skill in the art would have been motivated to combine Buddhikot’s teachings regarding the use of IPSec/VPN and Mobile IP with the implementation of the T-HA using an IPSec tunnel. Pet. 64–65. Petitioner’s reasoning is supported by the testimony of Dr. Lavian. Dr. Lavian points out both Buddhikot and Moran suggest using VPN with Mobile IP, and that the combination would provide detail about the tunnel endpoint in Buddhikot. Ex. 1003 ¶ 409; Ex. 1043 ¶¶ 10–11. We agree. Buddhikot teaches IPSec and Mobile IP to support

VPN operation over a network and Moran teaches further implementation details for a VPN gateway (the T-HA) and mobile device communications. Ex. 1006, 17:44–49; Ex. 1010, 3:10–22, 12:14–14:9.

Patent Owner argues that Moran requires the use of a corporate intranet with both a T-HA and an internal home agent, but that “[c]ritically” no internal home agent is discussed in Buddhikot. PO Resp. 48–50 (citing Ex. 1010, 4:9–15, Fig. 1). Although Patent Owner is correct that no internal home agent is discussed in Buddhikot, this alone does not undermine Petitioner’s reasons for combining Moran with Buddhikot. Rather, we are persuaded by Petitioner’s showing that one of skill in the art, considering Buddhikot, would have sought out Moran’s detailed teachings on the proxy and the related VPN implementation, including an internal home agent. Pet. 64 (citing Ex. 1003 ¶ 409). As such, we are persuaded that Petitioner’s evidence and analysis establishes that one of ordinary skill in the art would have had reasons to combine these references.

3. *Analysis of Asserted Obviousness over Buddhikot, Lord, and Moran*

a. *Alleged Obviousness of Claims 23 and 44*

Claim 23 depends from claim 16 and additionally requires that the proxy server “allocates the second public IP address for the second computing device and forwards data packets destined for the second public IP address to a current IP address associated with the second computing device, wherein the current IP address is distinct from the first public IP address and the second public IP address.” Claim 44 recites substantially similar limitations, and we discuss claim 23 as representative. See Pet. 70; PO Resp. 55.

With respect to claim 23, Petitioner indicates that the tunnel end-point is a proxy server in Buddhikot and home agent in Moran, and that having the tunnel end-point be the home agent would have been obvious to one of ordinary skill in the art. Pet. 65 (citing Ex. 1003 ¶ 412); *see also* Pet. 40–41 (describing the Mobile IP configuration of Buddhikot in which a packet addressed to a mobile node would be received by a “home agent” in a home network and forwarded to the gateway; citing Ex. 1006, 14:54–56, 20:24–47; Ex. 1003 ¶ 268). Petitioner argues that Moran teaches an internal home agent (I-HA) assigning to a mobile node a home address, which is used as the permanent external public IP address for the mobile node. Pet. 65–66 (citing Ex. 1010, 7:9–10, 7:27–30, 14:30–15:3; Ex. 1003 ¶ 412). We agree with Petitioner that this assignment in Moran, in combination with Buddhikot’s proxy server and tunnel end point teachings, teaches the allocation limitation of claim 23. Moran teaches or suggests a “care-of”/current IP address, which is used for the mobile node at the current connection to the Buddhikot gateway, and that the care-of address would be distinct from the home address. *Id.* (citing Ex. 1003 ¶ 414). Buddhikot teaches a care-of public IP address in the Mobile IP embodiment. Pet. 40–41 (citing Ex. 1006, 14:54–56, 18:38–42; Ex. 1003 ¶ 268).

Patent Owner argues that Moran’s home agent is not a proxy server because it does not receive and act upon requests and instead merely transfers traffic onward. PO Resp. 50–51 (citing Ex. 1010, 9:4–5). Yet Moran’s T-HA provides other functionality for a connecting mobile node, such as authentication. Ex. 1010, 9:16–17, 11:12–14. In this way, Moran teaches a home agent that “accepts requests from the device and acts on

behalf of the device” commensurate with our construction of “proxy server.”
See supra § II.B.2.

Patent Owner additionally argues that Moran’s allocation of the home IP address is performed by the I-HA and not the T-HA. PO Resp. 51 (citing Ex. 1010, 7:9–10, 7:30–31). We, however, agree with Petitioner that these would both be on the same server, and thus jointly would teach or suggest the proxy server, or that alternatively “the T-HA performs typical Mobile IP functions . . . by having the I-HA perform them on the T-HA’s behalf.” Pet. Reply 24 (citing Ex. 1010, 4:18–5:8; Ex. 1043 ¶¶ 38, 40).

On the entire trial record, Petitioner has shown by a preponderance of the evidence that claims 23 and 44 are unpatentable as obvious over Buddhikot, Lord, and Moran.

b. Alleged Obviousness of Claims 24 and 45

Claim 24 depends from claim 23 and additionally requires that the proxy server “replaces the current IP address with the second public IP address in data packets destined for other servers on the IP based network, wherein the data packets are tunneled from the second computing device, through the first computing device, through the first AP, through the IP network, to the proxy server.” Claim 45 recites substantially similar limitations, and we discuss claim 24 as representative. *See* Pet. 71; PO Resp. 55.

Patent Owner argues that Petitioner has not provided citations teaching or suggesting the further limitations of claim 24. PO Resp. 52. However, Petitioner argues that Moran teaches or suggests the home agent replacing a care-of address with a home address of a mobile node on outbound packets from the mobile node. Pet. 67–68 (citing, *inter alia*,

Ex. 1010, 10:19–23; Ex. 1003 ¶¶ 417–419); *see also* Ex. 1010, 10:22–27.

We are persuaded that this teaches the further limitations of claim 24. Patent Owner additionally raises arguments relating to the proxy server, which we have addressed *supra* Section II.D.4.a.

Petitioner has shown by a preponderance of the evidence that claims 24 and 45 are unpatentable as obvious over Buddhikot, Lord, and Moran.

c. Alleged Obviousness of Claims 25 and 46

Claim 25 depends from claim 23 and additionally requires that the proxy server “updates the current IP address associated with the second computing device in response to the second computing device connecting through a different AP.” Claim 46 recites substantially similar limitations, and we discuss claim 25 as representative. *See* Pet. 71; PO Resp. 55.

Patent Owner argues that Petitioner “cites no evidence” teaching or suggesting the further limitations of claim 25. PO Resp. 53. However, Petitioner argues that each of Buddhikot and Moran teach a care-of address used for a device’s current connection to the network, and the updating of this address when a device moves to a different network. Pet. 69 (citing Ex. 1006, Fig. 14, 24:26–27, 25:1–23; Ex. 1010, 15:5–7). We are persuaded that this teaches the further limitations of claim 25. Patent Owner additionally raises arguments relating to the proxy server, which we have addressed *supra* Section II.D.4.a.

Petitioner has shown by a preponderance of the evidence that claims 25 and 46 are unpatentable as obvious over Buddhikot, Lord, and Moran.

d. Alleged Obviousness of Claims 41 and 67

Claim 41 depends from claim 16 and additionally requires that the proxy server “provides a dynamic host configuration protocol (DHCP)

service that assigns an IP address for the second computing device.” Claim 67 recites substantially similar limitations, and we discuss claim 41 as representative. *See* Pet. 71; PO Resp. 55.

Patent Owner argues that Petitioner “cites no evidence” teaching or suggesting the further limitations of claim 41. PO Resp. 53–54. Petitioner argues that one of ordinary skill in the art “would understand that DHCP is the mechanism to allocate IP addresses, and would understand that the home agent would provide a DHCP service to allocate the home address.” Pet. 69–70 (citing Ex. 1003 ¶ 425; Ex. 1006, 15:29–31; Ex. 1007, 2:29–32 (disclosing that an intermediary mobile terminal could utilize a DHCP server to distribute IP addresses to connecting devices.)) We are persuaded that Buddhikot’s and Lord’s teachings relating to DHCP teach the further limitations of claim 41. Patent Owner additionally raises arguments relating to the proxy server, which we have addressed *supra* Section II.D.4.a.

Petitioner has shown by a preponderance of the evidence that claims 41 and 67 are unpatentable as obvious over Buddhikot, Lord, and Moran.

e. Alleged Obviousness of Claims 42 and 68

Claim 42 depends from claim 16 and additionally requires that the proxy server “provides a network address translation (NAT) service that translates IP addresses for the second computing device.” Claim 68 recites substantially similar limitations, and we discuss claim 42 as representative. *See* Pet. 71; PO Resp. 56.

With respect to this limitation, Petitioner references its prior argument, that Moran teaches a home agent which would teach the proxy server of claim 23. Pet. 65–66, 70 (citing Ex. 1010, 7:9–10, 7:27–30, 14:30–15:3; Ex. 1003 ¶ 412). Dr. Lavian testified that when the mobile node is in

the home network, the home agent would provide network address translation for the mobile node. Ex. 1003 ¶ 427. Additionally, Moran teaches that in the enterprise network that a mobile node may connect to via the home agent may be an “intervening NAT point” between the transfer home agent and internal home agent in Moran. Ex. 1006, 9:14–15, Fig. 1. Petitioner also cites Dr. Lavian’s unrebutted testimony that, for Mobile IP, one of ordinary skill would have understood it to be obvious to provide a NAT. Pet. 70 (citing Ex. 1003 ¶ 428). Patent Owner argues that Petitioner has not provided credible citations teaching or suggesting the further limitations of claim 42. PO Resp. 54. However, we determine that the evidence provided teaches that Moran’s home agent in an enterprise network would provide network access translation for the mobile node. Patent Owner additionally raises arguments relating to the proxy server, which we have addressed *supra* Section II.D.4.a.

Petitioner has shown by a preponderance of the evidence that claims 42 and 68 are unpatentable as obvious over Buddhikot, Lord, and Moran.

F. Asserted Obviousness over Buddhikot, Lord, and Abhishek

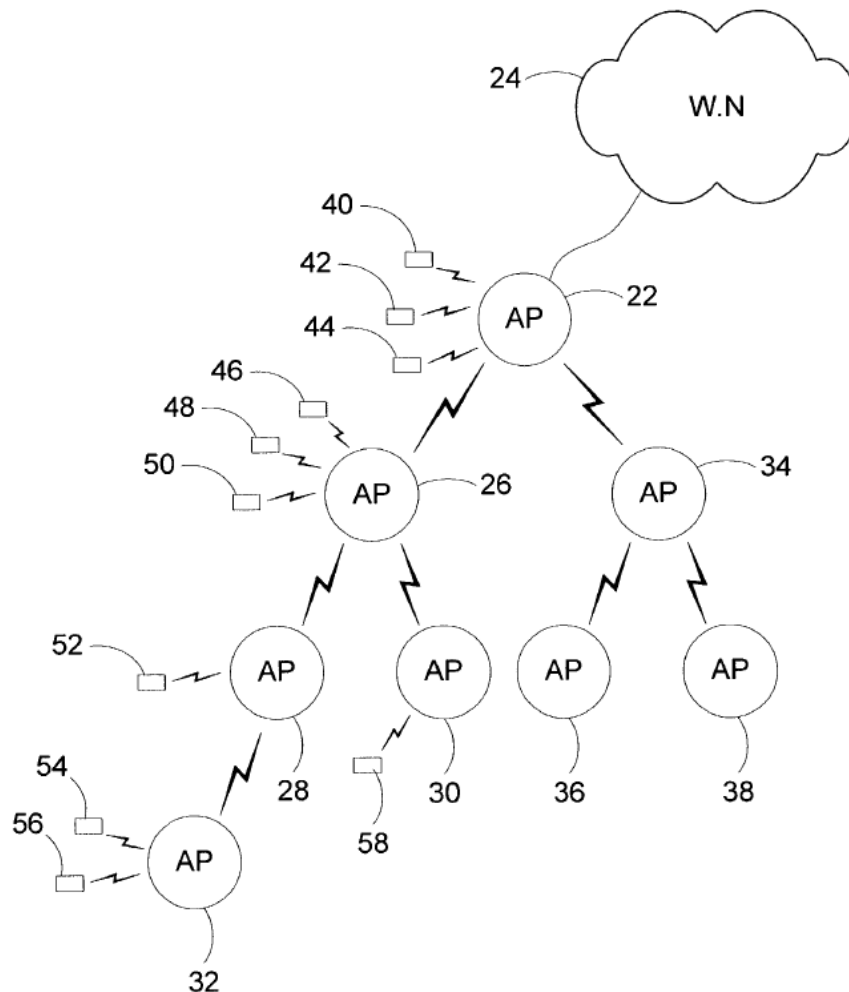
Petitioner contends claims 32, 33, 54, and 55 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Buddhikot, Lord, and Abhishek. Pet. 1, 72–75. Patent Owner presents arguments relating to these contentions. PO Resp. 48–53.

1. Overview of Abhishek

Abhishek is titled, “Native Wi-Fi Architecture for 802.11 Networks.” Ex. 1009, at [54]. Abhishek relates to a multi-layer wireless network with multiple access points providing connectivity to stations. *Id.* ¶¶ 11, 27, 174.

Figure 1 of Abhishek, reproduced below, illustrates the network structure of the Abhishek invention.

FIG. 1



As shown above in Figure 1, access point 22 has wired connectivity to wired network 24, and additional access points 22, 26, 28, 30, 32, 34, 36, and 38 are in wireless communication, directly or indirectly, with access point 22. *Id.* ¶ 27. The access points provide stations 40, 42, 44, 46, 48, 50, 52, 54, 56, and 58 the ability to access wired network 24 and communicate with each other. *Id.*

2. *Combination of Buddhikot, Lord, and Abhishek*

Petitioner argues Buddhikot, Lord, and Abhishek are all in the field of access points connecting wireless devices to the Internet. Pet. 72. Petitioner additionally argues that a person of ordinary skill in the art would have been motivated to use the bridging functionality of Abhishek to extend the range of the wireless devices taught in Buddhikot and Lord. *Id.* at 72–73.

Patent Owner contends that there is no meaningful motivation to combine the references, and that Buddhikot teaches away from Abhishek because Buddhikot discloses transitions from 802.11-connected access points to 3G network connections, but Abhishek seeks to provide additional 802.11 access points. PO Resp. 56–57. Therefore, Patent Owner argues, “[t]here is no need for the application of Abhishek in the Buddhikot environment.” *Id.* at 56.

We disagree. Abhishek would have provided supporting implementation details for Buddhikot’s suggestion that access points may be indirectly connected to a gateway providing access to a network. *See* Pet. 73 (citing Ex. 1006, 7:11–14); Pet. Reply 26. Based on the entire trial record, we are persuaded that Petitioner’s evidence and analysis establishes a reason to combine Abhishek with Buddhikot and Lord.

3. *Analysis of Asserted Obviousness over Buddhikot, Lord, and Abhishek*

a. *Alleged Obviousness of Claim 32 and 54*

Claim 32 depends from claim 16 and additionally requires that the second computing device “is further adapted to provide a third wireless enabled computing device with access to destinations on the IP based network by causing the second computing device to serve the third device as

a third AP having a third APID, distinct from the first APID and from the second APID, and provide the third device access to the IP based network via the second AP using the connection between the first computing device and the IP based network through the first AP.”

Claim 54 recites substantially similar limitations, and we discuss claim 32 as representative. *See* Pet. 75; PO Resp. 58.

Petitioner indicates with respect to claim 32 that Abhishek’s discussion of multi-layer networking in which access point bridges provide additional connection points, in combination with Buddhikot’s and Lord’s teachings with respect to claim 16, teaches or suggests that a station such as that in Buddhikot could provide additional stations (i.e., a “third device”) a connection to the IP based network. Pet. 74 (citing Ex. 1009 ¶¶ 27-30, Fig. 1). Patent Owner contends Petitioner has not established that the APID for the third device is distinct from the first APID and from the second APID, as required in claim 32. PO Resp. 57. However, Dr. Lavian provides uncontroverted testimony that, in a network with multiple access points such as that of Abhishek, one of ordinary skill would have expected the APIDs of the multiple access points to be distinct from one another. *See* Ex. 1003 ¶¶ 89, 241, 245, 246. Considering Dr. Lavian’s testimony on the understanding of an ordinarily skilled artisan, we are persuaded by Petitioner’s analysis that the combination of Buddhikot, Lord, and Abhishek teaches the additional limitation in claim 32.

On the entire trial record, we determine that Petitioner has shown by a preponderance of the evidence that claims 32 and 54 are unpatentable as obvious over Buddhikot, Lord, and Abhishek.

b. Alleged Obviousness of Claim 33 and 55

Claim 33 depends from claim 32, and adds the limitation that “the second computing device restricts destinations on the IP based network accessible by the third device.” Claim 55 recites substantially similar limitations, and we discuss claim 33 as representative. *See* Pet. 75; PO Resp. 59.

Citing Buddhikot’s teaching of a firewall to protect devices at an access point, Petitioner argues with respect to claim 33 that one of ordinary skill would have understood that an access point would include a firewall to protect internal IP addresses. Pet. 74–75 (citing Ex. 1003 ¶ 449; Ex. 1006, 10:55–59, 11:4–8). Petitioner also relies on Lord’s teaching about virtually separating connections for each device. *Id.* at 74 (citing Ex. 1007, 2:33–39, 3:57–62).

Upon review of Petitioner’s evidence and analysis, and taking into account Patent Owner’s arguments, we determine the combination of Buddhikot, Lord, and Kim teaches the additional limitation in claim 33. As we found *supra* in Section II.D.4.i with respect to claim 14, Buddhikot and Lord both include teachings relating to restriction of destinations on a device functioning as an intermediary, as taught or suggested by the combination with Abhishek. *See* Ex. 1006, 11:4–8; Ex. 1007, 3:56–60.

On the entire trial record, we determine that Petitioner has shown by a preponderance of the evidence that claims 33 and 55 are unpatentable as obvious over Buddhikot, Lord, and Abhishek.

G. Asserted Obviousness over Buddhikot, Lord, and Kim

Petitioner contends claims 13, 38, and 64 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Buddhikot, Lord,

and Kim. Pet. 1, 75–78. Patent Owner presents arguments relating to these contentions. PO Resp. 60–61; PO Supp. Resp. 1–3.

1. *Overview of Kim*

Kim is titled, “Gateway for Supporting Communications between Network Devices of Different Private Networks.” Ex. 1008, at [54]. Kim relates to supporting secure communication between private networks, each of which connects to the Internet. *Id.* Abstr., ¶¶ 3, 19. In describing the related art, Kim describes using network address port translation (NAPT), assigning one shared address to a gateway that translates packet address information including a destination port number and forwards the packet to a correct destination within a home network. *Id.* ¶¶ 10–14.

2. *Combination of Buddhikot, Lord, and Kim*

Petitioner argues Buddhikot, Lord, and Kim are all in the field of communicating between devices across different networks. Pet. 75. Petitioner additionally argues that a person of ordinary skill in the art would have been motivated to use Kim’s teaching of the NAPT extension of network address translation (NAT) in Buddhikot’s gateway, in light of teachings of Buddhikot with respect to NAT. *Id.* at 75–76 (citing Ex. 1003 ¶ 455).

Patent Owner argues that Petitioner presents no meaningful motivation to combine the references, and that Buddhikot teaches away from combination with Kim. PO Resp. 59. Patent Owner contends that as “the only inter-network communication disclosed by Buddhikot relies exclusively on the use of public IP addresses,” Kim’s teachings regarding translations within a private network would not have been useful in combination with the

teachings of Buddhikot. *Id.* Patent Owner further contends that NAT does not require the translation function of NAPT. *Id.*

Buddhikot discloses NAT functionality in a gateway, and Kim discloses the use of NAPT in a gateway. Ex. 1006, 16:50–53, 24:36–40; Ex. 1008 ¶¶ 10–14 (cited in Pet. 75–76 and Pet. Reply 26). Petitioner adduces evidence and testimony that NAPT is an extension of NAT, which supports Petitioner’s proposed combination. Ex. 1003 ¶ 455; Ex. 1021, 11. Accordingly, we are persuaded that one of ordinary skill in the art would have had reason to combine these references.

3. *Analysis of Asserted Obviousness over Buddhikot, Lord, and Kim –Alleged Obviousness of Claims 13, 38, and 64*

Claim 38 depends from claim 37, which in turn depends from claim 16. Claim 37 (addressed *supra*, at § II.D.4.h) adds to claim 16 the limitation that “the second public IP address is shared by the second computing device with at least one other device of the other wireless enabled computing devices.” Claim 38 adds the limitation that “data packets destined for each of the second computing device and the at least one other device are differentiated using different port numbers.”

Claims 13 and 64 recite substantially similar limitations, and we discuss claim 38 as representative. *See* Pet. 76–77; PO Resp. 61; PO Supp. Resp. 1.

Petitioner indicates that Kim teaches the use of ports in order to differentiate between target devices for a packet. Pet. 76 (citing Ex. 1008 ¶¶ 10–14; Ex. 1003 ¶ 457). Patent Owner argues that Petitioner has not shown why a person of ordinary skill would have incorporated a port translation function into a gateway. PO Resp. 60–61. However, as

addressed above, we agree that Kim’s discussion of the use of NAPT as an extension of NAT, and Buddhikot’s disclosure of a gateway “preferably . . . support[ing] private addressing schemes” using NAT, teaches or suggests the use of NAPT to support additional private addressing. Pet. 49, 75–76; Pet. Reply 26.; Ex. 1008 ¶¶ 10–14; Ex. 1006, 16:50–52.

We find that Petitioner has shown by a preponderance of the evidence that claims 13, 38, and 64 are unpatentable as obvious over Buddhikot, Lord, and Kim.

III. PROCEDURAL ISSUES

A. *Patent Owner’s List of Improper Supplemental Reply Arguments*

On June 8, 2018, after a conference call with the parties, we authorized Patent Owner to file a List of Improper Supplemental Reply Arguments listing alleged material in Petitioner’s Supplemental Reply that allegedly exceeded the proper scope of a reply, and authorized Petitioner to file a response to the items on the list. Paper 30, 4. The parties filed these papers. Paper 33 (“Patent Owner’s List”); Paper 35 (“Petitioner’s Response to Patent Owner’s List”). We stated, “[w]e may address the propriety or impropriety of the identified portions of the Supplemental Reply, to the extent necessary, in our Final Written Decision.” Paper 30, 4.

We have considered Patent Owner’s List, but we disagree that the cited portions of Petitioner’s Supplemental Reply and reply evidence are beyond the scope of what is appropriate for a reply. Replies are a vehicle for responding to arguments raised in a corresponding Patent Owner Response. We find that Petitioner’s arguments and evidence fairly respond to Patent

Owner’s arguments raised in Patent Owner’s Supplementary Response, and therefore, are not beyond the proper scope of a reply. *See Idemitsu Kosan Co., LTD. v. SFC Co. LTD*, 870 F.3d 1376, 1381 (Fed. Cir. 2017) (“This back-and-forth shows that what [Patent Owner] characterizes as an argument raised ‘too late’ is simply the by-product of one party necessarily getting the last word. If anything, [Patent Owner] is the party that first raised this issue, by arguing—at least implicitly—that [a reference] teaches away from non-energy-gap combinations. [Petitioner] simply countered, as it was entitled to do.”); *Anacor Pharms., Inc. v. Iancu*, 889 F.3d 1372, 1380 (Fed. Cir. 2018) (“In addition, the petitioner in an inter partes review proceeding may introduce new evidence after the petition stage if the evidence is a legitimate reply to evidence introduced by the patent owner . . .”).

Patent Owner identifies allegedly new arguments and evidence regarding the construction of the communication module limitation. Patent Owner List 1–2. We agree with Petitioner (Paper 33, 1–2) that arguments relating to the construction of the communication module limitation and citations to the ’306 patent specification relate to arguments in the Patent Owner Preliminary Response, which are incorporated by reference in the Supplemental Reply. *See* PO Supp. Resp. 1.

Patent Owner objects to the second declaration of Dr. Lavian (Ex. 1043) and references to it in Petitioner’s Reply. Patent Owner List 2. We previously determined that Patent Owner did not seek relief regarding any new arguments in the Reply promptly after the time of that filing and declined to authorize any relief. Paper 30, 2–3; Paper 40, 2. We further note that

if the petitioner submits a new expert declaration with its Reply, the patent owner can respond in multiple ways. It can cross-examine the expert and move to file observations on the cross-examination. It can move to exclude the declaration. It can dispute the substance of the declaration at oral hearing before the Board. It can move for permission to submit a surreply responding to the declaration's contents. And it can request that the Board waive or suspend a regulation that the patent owner believes impairs its opportunity to respond to the declaration. The options are not mutually exclusive.

Belden Inc. v. Berk-Tek LLC, 805 F.3d 1065, 1081 (Fed. Cir. 2015).

Patent Owner has done none of these.

Additionally, Patent Owner identifies a term ("VPN server") that Patent Owner states was not included in Petitioner's papers prior to Petitioner's Reply. Patent Owner List 2. As Patent Owner notes, Petitioner's recent filings use the term "VPN server" as opposed to "VPN gateway." *Compare* Pet. Reply 11–13 *with* Pet. 37–40, 48. However, Patent Owner has not established that the two terms are meaningfully different from each other, and to the extent that they are, we do not find the use of a new term rises to the level of impermissible new argument or evidence. Arguments regarding whether Buddhikot teaches or suggests a "proxy server" as in the claims have been clearly before us since the filing of the Petition. *See* Pet. 37–40.

For these reasons, we do not determine that Petitioner has exceeded the proper scope of reply in Petitioner's Supplemental Reply.

B. Constitutionality

Patent Owner also objects to the constitutionality of this *inter partes* review. PO Resp. 61–62 (*citing Oil States Energy Services, LLC v. Greene's Energy Group, LLC*, No. 16–712 (U.S. Nov. 23, 2016, cert. granted June 12,

2017)). However, on April 24, 2018, the Supreme Court held that “inter partes review does not violate Article III or the Seventh Amendment” of the Constitution. *Oil States Energy Servs., LLC v. Greene’s Energy Grp., LLC*, 138 S. Ct. 1365, 1379 (2018). Therefore, Patent Owner’s argument is moot.

IV. CONCLUSION

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

A. Claims 1, 3–12, 14–17, 19, 21, 22, 26–31, 34–37, 39, 40, 43, 48–53, 56, 58–63, 65, and 66 are unpatentable as obvious over Buddhikot and Lord;

B. Claims 23–25, 41, 42, 44–46, 67, and 68 are unpatentable as obvious over Buddhikot, Lord, and Moran;

C. Claims 32, 33, 54, and 55 are unpatentable as obvious over Buddhikot, Lord, and Abhishek; and

D. Claims 13, 38, and 64 are unpatentable as obvious over Buddhikot, Lord, and Kim.

We further determine that Petitioner has not demonstrated by a preponderance of the evidence that any of claims 2, 18, 20, 47, and 57 are unpatentable as obvious over Buddhikot and Lord.

V. ORDER

For the foregoing reasons, it is:

ORDERED that claims 1, 3–17, 19, 21–46, 48–56, and 58–68 of the '306 patent are unpatentable; and

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

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