

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORP., DELL TECHNOLOGIES INC., AND DELL INC.,
Petitioner,

v.

OZMO LICENSING LLC,
Patent Owner.

IPR2023-01060
Patent 8,599,814 B2

Before MIRIAM L. QUINN, LARRY J. HUME and
STEPHEN E. BELISLE, *Administrative Patent Judges*.

QUINN, *Administrative Patent Judge*.

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

I. INTRODUCTION

Microsoft Corp., Dell Technologies Inc., and Dell Inc. (“Petitioner”) filed a Petition (Paper 1, “Petition” or “Pet.”) requesting an *inter partes* review of claims 1–13 (“the challenged claims”) of U.S. Patent No. 8,599,814 B2 (Ex. 1001, “the ’814 patent”) pursuant to 35 U.S.C. §§ 311–319. Ozmo Licensing LLC (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Preliminary Response” or “Prelim. Resp.”).

The standard for institution is set forth in 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted unless the information presented in the Petition and the Preliminary Response shows that “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314 (2018); *see also* 37 C.F.R. § 42.4(a) (2022) (“The Board institutes the trial on behalf of the Director.”). Upon consideration of the contentions and the evidence of record, we conclude that Petitioner has established a reasonable likelihood of prevailing in demonstrating the unpatentability of at least one challenged claim of the ’814 patent. Accordingly, we grant Petitioner’s request and institute an *inter partes* review.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner states that Microsoft Corp., Dell Technologies Inc., and Dell Inc. are real parties in interest. Pet. 1.

Patent Owner states that Ozmo Licensing LLC is owner and the real party in interest. Paper 8, 1 (Patent Owner’s Mandatory Notices).

B. Related Matters

The parties identify various district court litigation matters, pending or dismissed in the Western District of Texas, involving the '814 patent.

Pet. 1; Paper 8, 2–3. Patent Owner further notes that a patent related to the '814 patent, U.S. Patent No. 9,264,991 (“the '991 patent”), is involved in an instituted, and pending, *inter partes* review: *Unified Patents v. Ozmo Licensing*, IPR2023-00193. *See* Paper 3 (identifying also related district court litigation matters concerning the '991 patent). According to Patent Owner, the '991 patent is related to the '814 patent via a claim of benefit. *Id.* at 3–4 (noting that seven other patents also claim benefit of the '814 patent).

C. The '814 Patent

The '814 patent relates generally to wireless communications, and more specifically to “seamlessly integrating short-range wireless personal area networks (‘WPANs’) into longer-range wireless local area network (‘WLANs’). Ex. 1001, 1:25–29.

The '814 patent explains that WLAN connectivity is widely implemented via 802.11x protocols and correspondingly compliant equipment. *Id.* at 1:40–67. One mode of operation of WLAN configuration is the infrastructure mode, in which an access point (“AP”) manages the infrastructure network. *Id.* at 2:1–11. Through the AP, the network connects to the Internet and other WLANs, and stations (“STAs”) become associated to the infrastructure network. *Id.* at 2:11–20.

“In contrast to WLAN, no such unifying standard exists for WPAN.” *Id.* at 2:22–23. Instead, mixtures of standardized and proprietary protocols have

been developed, such as Bluetooth. *Id.* at 2:23–35. Furthermore, when implementing WPAN technology in the vicinity of or within the WLAN network, devices may be using the same 2.4 GHz frequency band asynchronously, causing severe interference. *Id.* at 2:35–44.

One alternative is to use WLAN circuitry in the stations of a WPAN. *Id.* at 2:45–48. However, a WLAN station (STA) used in WPAN applications would undesirably result in having to replace batteries of the WPAN devices more frequently. *Id.* at 2:48–62. Furthermore, the WLAN STAs typically communicate at a comparatively high data rate and need to regularly listen to the beacons the AP transmits, even when on power save mode. *Id.* at 3:1–28.

An exemplary system is shown in Figure 3, reproduced below.

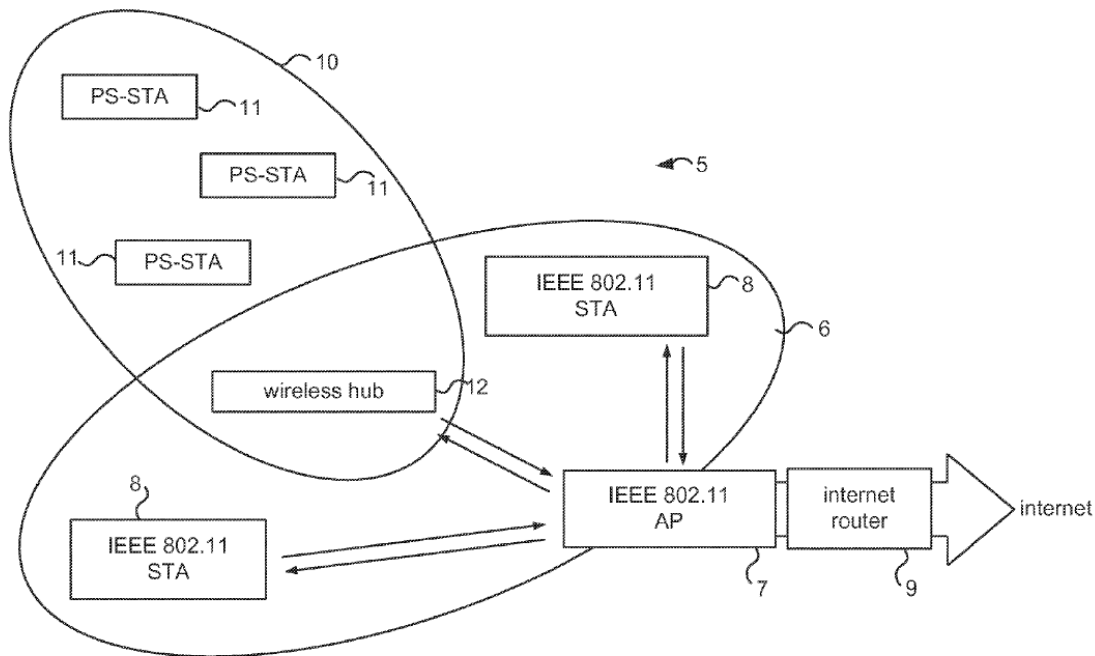


FIG. 3

Figure 3 depicts WPAN 10 integrated with WLAN 6 to form integrated network 5. Ex. 1001, 4:63–66. WLAN 6 is 802.11x compliant

and may operate in either infrastructure mode (as described above) or in ad hoc mode. *Id.* at 5:1–4. STAs 8 include an 802.11x compliant wireless circuit, are associated with and synchronized to AP 7, and periodically listen to beacons from AP 7. *Id.* at 5:7–14.

Figure 3 also depicts WPAN 10 including power-sensitive stations 11 (“PS-STA”). *Id.* at 5:19–20. A PS-STA is defined as “a device that is battery-operated and for which maximizing battery-life is beneficial to the application and/or user.” *Id.* at 5:20–22. The PS-STA is typically in sleep mode most of the time, waking up occasionally to communicate and exchange information. *Id.* at 5:27–30. Each PS-STA 11 is equipped with a wireless circuit that can communicate directly with a standard 802.11x-compliant wireless circuit. *Id.* at 5:30–33. The PS-STA 11 is not required, however, to be fully compliant with the 802.11x specification and some PS-STAs 11 may have reduced power dissipation thereby extending the battery life. *Id.* at 5:34–36.

Figure 3 further depicts wireless hub 12 that facilitates seamless communication between the WLAN and the WPAN. *Id.* at 5:49–51. Wireless hub 12 includes a wireless 802.11x-compliant wireless circuit that communicates with AP7 of infrastructure WLAN 6 and with PS-STAs 11 of WPAN 10. *Id.* at 5:51–54. Wireless hub 12 is placed within range of the PS-STAs 11, about 30 feet, and also within range of AP7, typically about 300 feet. *Id.* at 5:66–6:4. The wireless hub can be integrated within an electrical power outlet, as well as other electrical devices, such as light bulbs, light switches, thermostats, energy meters, personal computers, personal digital assistants, cellular phones, home entertainment equipment, and the like. *Id.* at 6:5–13.

The '814 patent describes further embodiments. For instance, it describes a WPAN used to connect a headset to a mobile phone, or a mouse/keyboard to a laptop, or a remote control to a wireless-enabled electronic device. *Id.* at 9:36–47. In these cases, the computing device (i.e., mobile phone or laptop) communicates with the WPAN device (such as the headset or other peripherals), using a secondary network protocol, also referred to as WPAN protocol, to reduce interference. *Id.* at 9:60–10:5; 10:11–16; 10:30–33. This secondary network protocol is an “overlay protocol that is partially compatible with the WLAN protocol, but not entirely, in terms of power, frame contents and sequences, timing, etc.” *Id.* at 10:1–5. As explained by the '814 patent, the secondary network (WPAN) protocol, “might be 802.11x frames with new frame arrangements adapted for WPAN needs, such as reduced latency, power, etc.” *Id.* at 10:5–8.

D. Illustrative Claim

Of the challenged claims, claim 1 is independent. Claim 1 is reproduced below, with relevant language discussed in detail below italicized.

1. A network-enabled hub, usable for facilitating data communications between two or more wireless devices that are configured to communicate indirectly with each other via the network-enabled hub, comprising:

an interface to a wireless radio circuit that can send and receive data wirelessly, providing the hub with bi-directional wireless data communication capability;

logic for processing data received via the wireless radio circuit;

logic for generating data to be transmitted by the wireless radio circuit;

logic for initiating and maintaining wireless network connections with nodes of a wireless network external to the network-enabled hub, maintaining at least a first wireless network connection using a first wireless network protocol and a second wireless network connection using a second wireless network protocol, that can be maintained, at times, simultaneously with each other in a common wireless space, *wherein the second wireless network protocol is an overlay protocol with respect to the first wireless network protocol in that communications using the second wireless network protocol are partially consistent with the first wireless network protocol* and at least some of the communications using the second wireless network protocol impinge on at least some antennae used for the first wireless network; and

data forwarding logic, implemented in the network-enabled hub using hardware and/or software, that forwards data between an originating node and a destination node, wherein the originating node is a node in one of the first and second wireless networks and the destination node is a node in the other of the first and second wireless networks.

Ex. 1001, 25:16–36 (emphasis added). The italicized language is referred to hereinafter as the “overlay protocol limitation.”

E. Asserted Grounds and Testimony

Petitioner presents the challenges summarized in the chart below.

Pet. 3.

Claim(s) Challenged	35 U.S.C. §	Reference/Basis
1, 3, 5–7, 9–13	103(a) ¹	Sugar, ² Bluetooth, ³ and Shin ⁴
2	103(a)	Sugar, Bluetooth, Shin, and Cromer ⁵
1, 4, 7, 8	103(a)	Giaimo ⁶ and Sinivaara ⁷
1	103(a)	Gurevich, ⁸ Hansen, ⁹ 802.11-1999, ¹⁰ 802.11b, ¹¹ and 802.11g ¹²

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. §§ 102 and 103 that became effective after the earliest effective filing date of the challenged claims.

Therefore, we apply the pre-AIA version of 35 U.S.C. §§ 102 and 103. Our decision is not affected by which version is used.

² US 2002/0061031 A1, published May 23, 2002 (Ex. 1004, “Sugar”).

³ Specification of the Bluetooth System, Core, Version 1.1, Feb. 22, 2001 (Ex. 1006, “Bluetooth”).

⁴ US 2004/0071123 A1, published April 15, 2004 (Ex. 1005, “Shin”).

⁵ US 2005/0165909 A1, published July 28, 2005 (Ex. 1022, “Cromer”).

⁶ US 2004/0090924 A1, published May 13, 2004 (Ex. 1008, “Giaimo”).

⁷ WO 2005/006659 A1, published January 20, 2005 (Ex. 1007, “Sinivaara”).

⁸ US 2005/0174962 A1, published August 11, 2005 (Ex. 1010, “Gurevich”).

⁹ US 2005/0180368 A1, published August 18, 2005 (Ex. 1009, “Hansen”).

¹⁰ ANSI/IEEE Standard 802.11, 1999 Edition (R2003) (Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications (Ex. 1017, “802.11-1999”).

¹¹ IEEE Standard 802.11b-1999, Higher-Speed Physical Layer Extensions in 2.4 GHz Band, (Approved September 16, 1999) (Ex. 1018, “802.11b-1999”).

¹² IEEE Standard 802.11g-2003, Amendment 4: Further Higher Data Rate Extension in the 2.4 GHz Band (Approved June 12, 2003) (Ex. 1019, “802.11g-2003”).

Petitioner supports its challenge of invalidity with a declaration of Zhi Ding, Ph.D., filed as Exhibit 1002 (“Ding Decl.”).

Patent Owner has not submitted testimonial evidence at this stage of the proceeding.

III. ANALYSIS

A. *Level of Ordinary Skill in the Art*

Petitioner contends that a person having ordinary skill in the art (POSA) “would have had a Bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, with at least two years of experience in the field of wireless communication systems and protocols, with an allowance for additional education or experience that might substitute for those requirements.” Pet. 7. Petitioner also states that a person having ordinary skill in the art would have been skilled at working with the Bluetooth Specification and 802.11/a/b/g standards.” *Id.* (citing Ding Decl. ¶¶ 27, 28. Patent Owner does not dispute the level of ordinary skill in the art. *See* Prelim. Resp.

At this stage of the proceeding, there is no dispute concerning the proposed level of ordinary skill in the art. We adopt Petitioner’s assessment, which at this juncture appears reasonable given the specification of the ’814 patent and asserted prior art of record.

B. *Claim Construction*

In *inter partes* review proceedings based on petitions filed on or after November 13, 2018, such as this one, we construe claims using the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), as articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303

(Fed. Cir. 2005) (en banc), and its progeny. *See* 37 C.F.R. § 42.100(b) (2019).

I. “Overlay Protocol”

At this juncture there is a claim construction issue for the term “overlay protocol” recited in claim 1 of the ’814 patent. The Petition states that “overlay protocol” means “a protocol governing a second network, which protocol has aspects in common with a first network protocol to provide one or more advantages.” Pet. 8. According to Petitioner, this definition is explicitly provided in the intrinsic record of the patent and is consistent with the disclosed embodiments and the file history. *Id.* at 8–9. Petitioner also states that the district court has construed certain terms of the ’814 patent and that Petitioner has applied those constructions in this proceeding. Pet. 8; Ex. 1036. We note, however, that Petitioner failed to explain that its proposed construction of “overlay protocol” is different from the district court’s claim construction. Nor does the Petition provide argument for why the Board should adopt a construction that is different from the one the district court has adopted.

Patent Owner points out that Petitioner’s statement regarding claim construction is disingenuous because, although Petitioner purports to apply the district court’s construction of “overlay protocol,” the Petition implicitly applies a construction that the court rejected. Prelim. Resp. 19.

Faced with this dispute, we now consider the claim construction that the district court issued for “overlay protocol.” *See* 37 C.F.R. § 42.100(b) (“Any prior claim construction determination concerning a term of the claim in a civil action, or a proceeding before the International Trade Commission, that is timely made of record in the *inter partes* review proceeding will be

considered.”). According to the *Consolidated Trial Practice Guide*, (Nov. 2019), 45–46, available at <https://www.uspto.gov/TrialPracticeGuideConsolidated/> (“Trial Practice Guide”), the Board will give the district court claim construction the appropriate weight upon considering, among the non-exclusive factors, the similarities between the present record and the record in the district court, and whether the district court determination is final.

The Claim Construction Order of July 5, 2023 includes a construction for the term “overlay protocol,” as follows: “protocol governing a second network, which protocol has aspects in common with a first network protocol to reduce interference such that the second and first network can co-exist.” Ex. 1036, 6 (“the 2023 Order”). The 2023 Order states that a more-detailed order explaining the analysis for the court’s constructions will be forthcoming. *Id.* at 1. Although the record before us leaves us unaware of whether the court has issued the follow-on analysis to the 2023 Order, the record before us includes another, and final, claim construction order with a detailed analysis of the ’814 patent’s “overlay protocol.” Ex. 1015 (issued on September 20, 2022) (“the 2022 Order”). Referring to the ’814 patent claim language, that 2022 Order explains the court’s analysis as follows:

The contextual use of the term “overlay protocol” in the claims provides some clarity as to its scope and meaning. For example, claim 1 recites that “the second wireless network protocol is an overlay protocol with respect to the first wireless protocol in that communications using the second wireless network protocol are partially consistent with the first wireless network protocol.” *See* ’814 Patent at 14:63–15:1. This usage indicates that an overlay protocol is one that shares some commonality with another protocol.

Ex. 1015, 24.

The 2022 Order further addresses the parties' dispute as to whether the construction should address reduced interference and co-existence. *Id.* at 25–26; *see also* Ex. 1024, 12:24–16:2 (arguing to the court that the issue of reducing interference so the two networks can coexist was an improper inclusion of specific embodiments into the claim). The court's analysis stressed that the "overlay protocol" is discussed extensively in U.S. Publication No. US 2006/0227753 A1 (Ex. 1012, "Vleugels I"), which the '814 patent incorporates by reference. Ex. 1015, 24; Ex. 1001, 1:16–21. The court noted that Vleugels I defines "overlay protocol" as having "elements that are reuses of elements of a PWN protocol to provide one or more advantages." Ex. 1015, 25 (quoting Ex. 1012, 9:39–41). The court did not stop there; it relied on further descriptions of the overlay protocol from Vleugels I, including the following quote, which describes the advantages provided by the common aspects of the protocols:

[T]here are many benefits of using an SWN protocol *such as an 802.11x overlay* instead of an all 802.11x protocol and by *suitable design of the SWN protocol, the SWNs and the PWN can co-exist . . .*

In the example of FIG. 3(d), it may be expected that mouse 320, keyboard 322, mobile phone 340 and headset 306 are not programmed for, and/or do not have circuits to support, use with an 802.11x primary network, but nonetheless they might use *an SWN protocol that has many aspects in common with an 802.11x protocol*, modified to accommodate the different needs of SWN devices *while providing a measure of co-existence*.

Id. (citing Ex. 1012, 10:15–29) (emphasis added by the court). Relying on additional citations to Vleugels I, with mentions of avoiding interference, the court was persuaded that the construction proposed by Patent Owner was supported by the intrinsic evidence and should be adopted. Ex. 1015, 26. In

other words, the court found support in the intrinsic record for the proposition that the “overlay protocol” of a second network has aspects in common with a first network protocol “to reduce interference such that the second and first network can co-exist.”

In this proceeding, Petitioner has proposed a claim construction that is broader than the district court’s claim construction. Under Petitioner’s construction, the common aspects between the “overlay protocol” and the first protocol merely confer “one or more advantages.” This construction is similar to the position previously argued to the district court. *See* Ex. 1036, 6; *see also* Ex. 1013, 4. There the defendant proffered the Vleugels I definition that the second protocol reuses elements of the first protocol “to provide one or more advantages.” Ex. 1036, 6. Patent Owner is correct that the district court considered, but did not adopt, a proposed construction that states general “advantages” of the common elements between protocols.

It is important for us to note that our claim construction standard is the same as the standard applied in district court and was adopted to avoid decisions that construe the same or similar claims of a patent inconsistently across the different forums. *Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51,340, 51,342 (Oct. 11, 2018). “Minimizing differences between claim construction standards used in the various fora will lead to greater uniformity and predictability of the patent grant, improving the integrity of the patent system.” *Id.* Petitioner has the burden of providing sufficient support for the claim construction it provided here, including an explanation for why the Board should consider anew a

construction the district court considered (including the same intrinsic evidence support) but did not adopt. Trial Practice Guide, 48.

After reviewing the district court’s claim construction analysis and the similarities between the failed arguments there and the proposed construction here, and considering the lack of explanation by Petitioner regarding why we should deviate from the prior construction, we hereby adopt the district court’s claim construction of “overlay protocol”—protocol governing a second network, which protocol has aspects in common with a first network protocol to reduce interference such that the second and first network can co-exist. At this juncture, we find reasonable the inclusion of the benefit to reduce interference such that the networks can co-exist because it aligns with the general descriptions of the overlay protocol. *See* Ex. 1001, 9:60–10:10 (explaining that communication with the WPAN device might proceed without interference from the conventional WLAN, such as by coordinating usage of the wireless medium using the overlay protocol that is partially compatible with the WLAN protocol).

We turn now to Patent Owner’s assertion that an unpatentability theory that relies on the Bluetooth protocol as an overlay protocol flouts the “overlay protocol” definition. Prelim. Resp. 19. This argument is directed to Petitioner’s asserted obviousness challenge over Sugar, Shin, and Bluetooth. *Id.* Although Patent Owner may be correct that an implied claim construction could be lurking in Petitioner’s challenge, we are inclined at this juncture to evaluate the issue as part of our analysis on the merits applying the construction of the term as stated above. Accordingly, we analyze the issue in connection with our discussion of the asserted grounds.

Consequently, given our analysis of the 2023 Order and 2022 Order as discussed above and considering the dispute over the scope of “overlay protocol,” we preliminarily adopt the district court’s construction for purposes of this Decision.

2. *Means Plus Function Terms*

Petitioner states that several claim terms are subject to 35 U.S.C. § 112(f) and that both parties agree on their construction as follows.

Pet. 9–10. Patent Owner does not dispute these assertions. Below is a summary of these terms and the stated construction, which we apply for purposes of this Decision.

Term	Function	Structure
logic for processing data received via a wireless radio circuit	As recited	Processing unit 28
logic for generating data to be transmitted by the wireless radio circuit	As recited	Processing unit 28
logic for initiating and maintaining . . .	As recited	Wireless circuit 27, processing unit 28, and software platform 36 (that enables the circuit to connect to both networks simultaneously)
logic to coordinate a mutually agreeable inactivity period	As recited	Processing unit 28 executing algorithms at 12:13–13:14
routing module for . . .	As recited	Processing unit 28 executing the algorithm at 7:66–8:7

Term	Function	Structure
logic for uniquely identifying . . .	As recited	Processing unit 28 routing based on IP addresses

No other terms require discussion at this point in the proceeding. *See, e.g., Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

C. Overview of the Asserted References

Petitioner relies on many references for the asserted grounds. We summarize the most relevant below.

1. Overview of *Sugar* (Ex. 1002)

Sugar discloses interference mitigation or collision avoidance systems and procedures to allow different WPAN and WLAN communication protocols to coexist in the same frequency band. *See* Ex. 1004. Abstr., ¶ 2. *Sugar* describes the existence of several wireless network protocols sharing the same unlicensed frequency spectrum (2.4 GHz unlicensed frequency band), which caused interference problems between different networks, such as IEEE 802.11b and Bluetooth. *See* Ex. 1004 ¶¶ 3, 4. *Sugar* recognizes that although these technologies were designed to work reliably with some frequency interference, they were not designed to co-exist with each other. *Id.* ¶ 6. *Sugar* then provides a multi-protocol wireless communication device (MPD) that acts as a node, hub or terminal on two or more wireless local or personal area networks, simultaneously. *Id.* ¶ 39. For instance, an

MPD may be a hub that operates simultaneously to communicate using protocols A and B with terminal nodes. *Id.* Some terminals may use only protocol A, some terminals may use only protocol B, and other terminals may use both. *Id.*

Figure 1 of Sugar (reproduced below) shows an example of a system in which an MPD communicates with various terminals.

FIG. 1

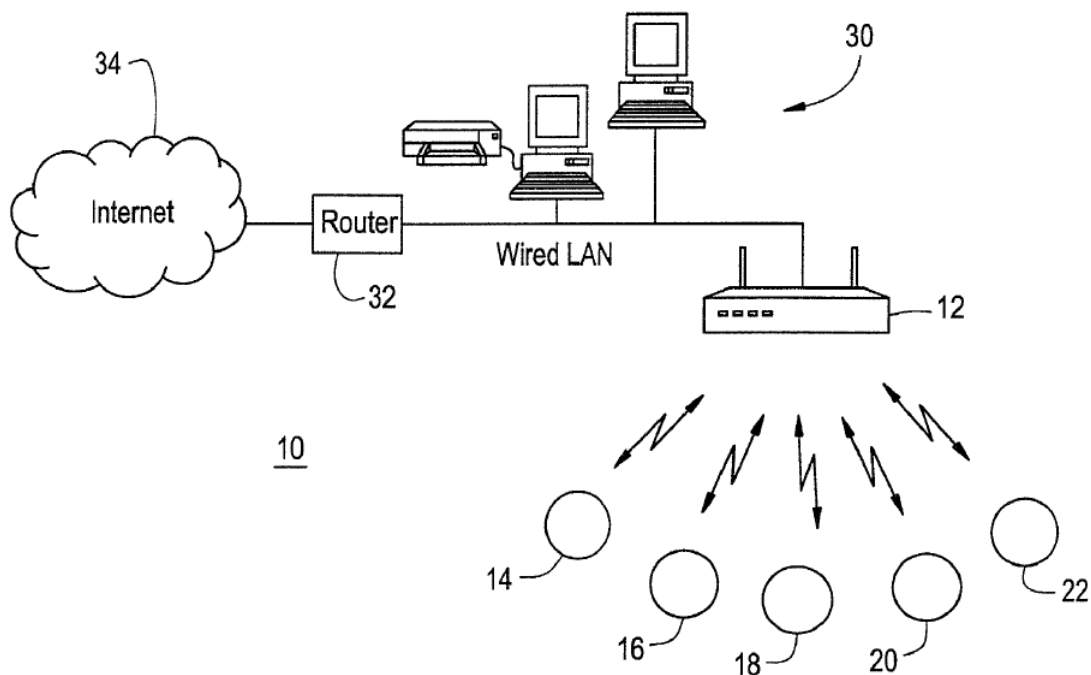


Figure 1 depicts system 10, with MPD 12 that communicates with terminal nodes 14, 16, 18, 20, 22. Terminals 14 and 22 are wireless communication devices that operate using a first protocol, such as 802.11. *Id.* ¶ 42.

Terminals 16 and 20 are wireless communication devices that operate using a second communication protocol, such as Bluetooth. *Id.* Sugar explains that two nodes each using WLAN technologies may nevertheless have

different protocols that differ in bandwidth, packet duration, and transmit power. *Id.* ¶¶ 48–50. Those same nodes, however, may be frequency hopped and occasionally overlap in frequency. *Id.* ¶ 49.

Sugar notes that interference occurs when two or more communication protocol signals overlap in time and frequency. *Id.* ¶ 51. The term “collision” is used to describe the case where two or more signals attempt to occupy a common medium at the same time. *Id.* Sugar also explains generally that an MPD may implement various techniques to mitigate interference, such as filter notching, prioritizing, polling, and delaying or scheduling transmission as determined by the collision algorithm. *Id.* ¶¶ 52–64.

Some of the algorithms for mitigating interference in Sugar, address implementing the Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) technique of the 802.11 standard. *Id.* ¶ 71. For instance, Sugar explains that using CSMA/CA, the sending node listens for a carrier on the 802.11 channel. *Id.* If the node detects that the channel is idle for at least one Distributed Coordination Function Interframe Space (DIFS), the node will transmit its data. *Id.* Otherwise, a counter is randomly generated to back off transmission, and when the counter reaches zero, the sending node transmits. *Id.* The node that receives the message waits one Short Interframe Space (SIFS) before transmitting an acknowledge message (ACK). *Id.* ¶ 72. If the sending node does not receive the ACK within a timeout period, it concludes the message was lost and attempts to transmit again (after executing another random backoff counter procedure). *Id.*

Sugar also explains that the Bluetooth protocol uses two data links: the Synchronous Connection Oriented (SCO) data link and the

Asynchronous Connectionless (ACL) data link. *Id.* ¶ 81. The SCO link carries digitized speech or video in full duplex mode, which means that SCO packets come in pairs—one packet for the downlink, the other for the uplink. *Id.* The ACL link carries asynchronous data for file transfer in 1, 3, 5 slots. *Id.* ¶ 82. With SCO packet there is no retransmission, but with ACL packets, the nodes use an ACK or no ACK retransmission scheme. *Id.*

To guarantee an acceptable level of voice quality for voice and data users, Sugar's MPD assigns a higher delivery priority to Bluetooth SCO packets than to Bluetooth ACL or 802.11 data. *Id.* ¶ 84. To guarantee reliable delivery of the Bluetooth SCO packets, Sugar's MPD transmits a "guard packet" on the 802.11 network immediately preceding the transmission of the SCO packet that falls inside the 802.11 band. *Id.* ¶ 85. The "guard packet" is an 802.11 message that takes control of the 802.11 link so other 802.11 devices do not transmit and the SCO packets are guaranteed delivery. *Id.* The MPD also transmits a "packet trailer" to provide additional protection from 802.11 terminals transmitting during SCO packet delivery. *Id.* ¶ 87. The MPD will also apply the filter notch technique to ensure that the packet trailer does not interfere with the Bluetooth SCO packet. *Id.* ¶ 88.

Sugar discloses different forms of a guard packet. One alternative of a guard packet is useful in an MPD that functions as an 802.11 access point (AP) and as either a Bluetooth master or a Bluetooth slave. *Id.* ¶ 91. In this mode, the guard packet uses a sequence of clear-to-send (CTS) packets, which the 802.11 stations interpret as delaying access to the medium for a period of time. *Id.* Another alternate mode of a guard packet is useful for an MPD that functions as an 802.11 station as well as Bluetooth master/slave,

and uses a sequence of ready-to-send (RTS) packets and a silent or “no TX” interval. *Id.* ¶ 92. An 802.11 AP that receives the RTS and the silent interval will transmit a CTS and reserves the medium for the 802.11 node to transmit/receive synchronous data. *Id.*

2. *Overview of Shin (Ex. 1005)*

Shin discloses an apparatus and method for linking a WLAN terminal and a Bluetooth terminal, to enable communications between them.

Ex. 1005, Abstr., ¶ 2. Shin explains that WLAN terminals have hardware and software for establishing an ad hoc network among those terminals, and that Bluetooth terminals have hardware and software for first determining if a service profile wants communication between terminals and that communications ensue as described in the Bluetooth profile. *Id.* ¶ 5.

Bluetooth terminals communicate only with other Bluetooth terminals, and WLAN terminals communicate only with WLAN module-based terminals, making it impossible to establish an ad hoc network between Bluetooth and WLAN terminals. *Id.* ¶ 6.

Shin describes the various functions of the Open System Interconnection (OSI) framework in the context of Bluetooth and WLAN communications. *Id.* ¶¶ 23–36. In particular, Shin describes the RF or physical layer of the OSI as the layer responsible for the Bluetooth and WLAN frequency operations in the 2.4 GHz band. *Id.* ¶¶ 23, 35. Further, Shin explains that the media access control (MAC) layer of the WLAN protocol stack manages modulation and transmission on the transmission line and determines whether or not there is a collision, using the CSMA/CA protocol. *Id.* ¶¶ 34–37. Shin also describes that both the WLAN and Bluetooth protocols use a TCP/IP layer, the third OSI layer, in which an IP

protocol handles the delivery and the TCP protocol handles the arrangement of data into packets. *Id.* ¶¶ 29, 30, 39. An IP address is a unique address of a computer in an organization and can be assigned automatically as a computer connects to a different location in the network. *Id.* ¶ 39.

Shin describes a structure of a mixed protocol stack of Bluetooth and WLAN, according to Figure 3, reproduced below. *Id.* ¶ 40.

FIG. 3

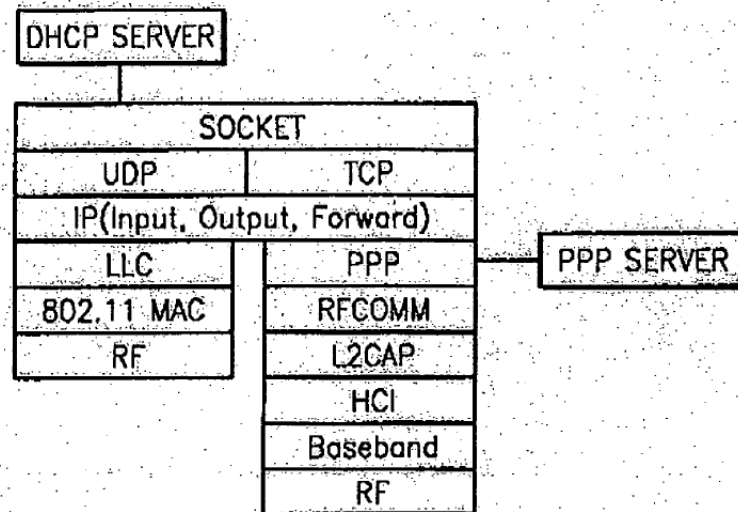


Figure 3 above describes the layers common to the Bluetooth protocol and WLAN protocol stacks. Ex. 1005 ¶ 41. The Bluetooth protocol stack begins at the bottom of the stack with the RF layer, and continues with the baseband through to the Point-to-Point Protocol (PPP). *Id.* The WLAN protocol stacks also begins with the RF layer, and continues with the 802.11 MAC layer and Logical Link Control (LLC) layer. *Id.* The IP layer is common for both protocols. *Id.*

Shin states that since the IP layer is common with the WLAN, an IP packet processed through the Bluetooth protocol stack is forwarded to the WLAN protocol stack. *Id.* ¶ 47. The IP packet forwarded to the WLAN protocol stack passes to the LLC layer that is the lower layer of the IP layer. *Id.* The signal that passes through the LLC layer passes to the 802.11 MAC layer. *Id.* ¶ 48. The MAC layer process shared medium access problems and determines whether there is a collision. *Id.* ¶ 49. The signal that passes through the 802.11 MAC layer passes to the RF layer, and becomes a WLAN signal complying with the 802.11 standard and is transmitted to other WLAN terminals. *Id.* ¶¶ 49, 50. Shin thus provides an environment in which a Bluetooth terminal is linked to a WLAN terminal through a Bluetooth wireless LAN compound terminal and communications between the terminals are enabled. *Id.* ¶ 50.

3. *Overview of Bluetooth Specification (Ex. 1006)*

The Bluetooth Specification filed as Exhibit 1006 is a volume describing various aspects of the Bluetooth specification, including radio specification, baseband specification, link manager protocol, logical link control and adaptation protocol specification, service discovery protocol, and transport layer protocols, among others. *See generally id.*

4. *Giaimo (Ex. 1008)*

Giaimo provides enhanced quality of service communication capability by implementing different channels that are used for conveying different types of data. 1008, Abstr. For instance, an 802.11a or 802.11g wireless device is used for communicating audio/video data on one channel, while an 802.11b wireless device is used on a different channel for communicating web page data. *Id.* In other words, transmissions that

require higher quality of service (QoS) may be made on a channel with lower latency and higher throughput using a protocol like 802.11a or 802.11g, while transmissions that require lower QoS can be made on channels with higher latency and lower throughput using a protocol like 802.11b. *See id.* ¶ 16. Giaimo further describes providing for “simultaneous maintenance of two wireless connections on two independent channels in the first wireless client device with Smart Wireless Routing.” *Id.* ¶ 17. One channel is maintained to the network AP in infrastructure mode, and another channel, either in “surrogate” AP mode or peer-to-peer (ad hoc) mode, is linked to a second wireless device. *Id.* If the second wireless device cannot communicate directly with the wireless AP at an acceptable data rate, the second wireless device can communicate with the wireless AP through the first wireless client device. *Id.* ¶ 18.

Giaimo further describes that its client media server would be equipped with two wireless devices so that each media client can operate on a different channel through a different wireless device in ad hoc mode. *Id.* ¶ 52.

5. *Sinivaara (Ex. 1007)*

Sinivaara describes a mechanism for decreasing power consumption in wireless terminals engaged in short-range, beacon-based communication. Ex. 1007, 3:12–14. Sinivaara modifies the MAC layer functionality, as compared to a standard WLAN terminal. *Id.* at 3:14–19. In particular, Sinivaara shortens the transmission interval of the terminal. *Id.* at 3:20–21. “By accelerating the transmission of the header contrary to the WLAN (i.e., 802.11) specifications, the processing time of the data packets can be made shorter than in the standard MAC layer.” *Id.* at 7:36–8:2. “The shorter

transmission intervals (i.e. shorter packet transaction intervals) obtained in this way translate to lower battery consumption, while also allowing the terminal more time for the sleep mode.” *Id.* at 8:2–5.

6. Gurevich (Ex. 1010)

Gurevich describes a “Generic Client” (GC) that operates multiple virtual network interfaces that communicate simultaneously to different networks. Ex. 1010, Abstr., ¶ 13. In one implementation, the GC provides simultaneous communication with both infrastructure and ad-hoc networks in compliance with the 802.11 protocol. *Id.* The GC provides these dual modes of operation by instantiating different infrastructure and ad hoc virtual interfaces. *Id.* Figure 3 of Gurevich, reproduced below, is illustrative of how the GC instantiates multiple virtual interfaces. *Id.* ¶ 17.

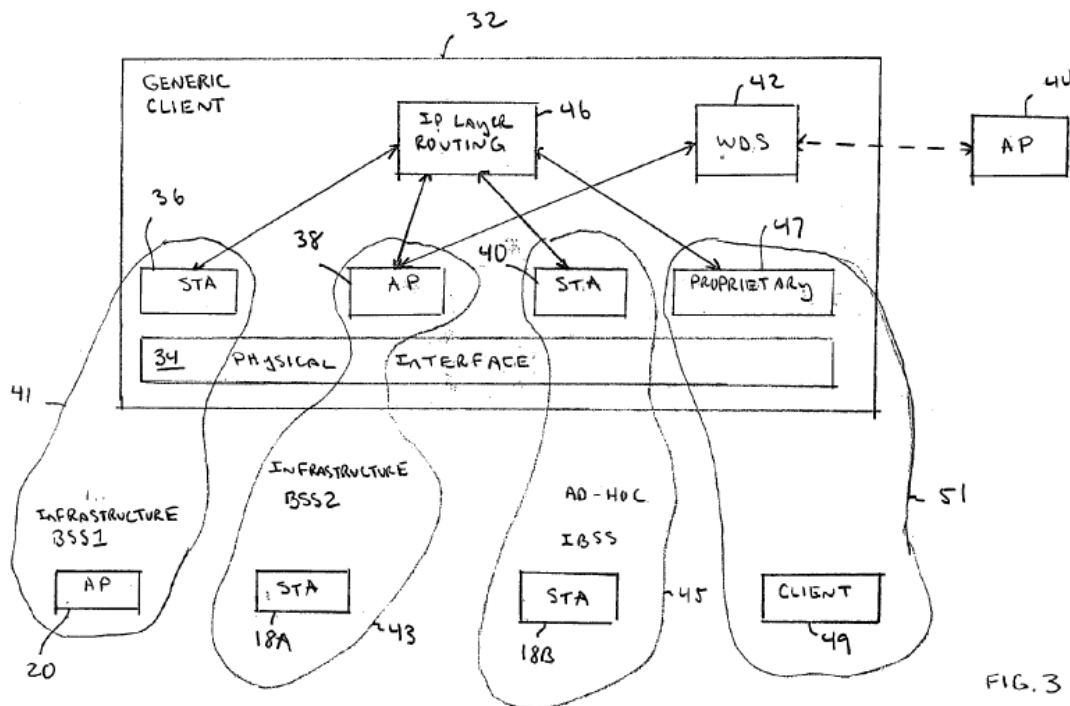


Figure 3 depicts GC 32 having a single physical layer (L1) interface 34, which may be a transceiver radio for communicating using the 802.11 protocol, to gain access to a wireless media. *Id.* ¶ 34. A software driver implements MAC functionality at layer 2 of the OSI standard to instantiate multiple simultaneous virtual network interfaces 36, 38, 40, and 42. *Id.* GC 32 simultaneously operates the multiple active logical interfaces. *Id.* For instance, STA infrastructure virtual interface 36 is configured to operate like a STA (client) for communicating with AP 20 in an 802.11 wireless infrastructure network 41. *Id.* ¶ 35. In contrast, “STA ad-hoc virtual interface 40 is configured to operate as a STA for communicating in an 802.11 ad-hoc communication network 45 directly with other clients or STAs 18B.” *Id.*

7. *Hansen (Ex. 1009)*

Hansen describes how multiple wireless protocols are supported within a wireless communication system. Ex. 1009 ¶ 13. Hansen first determines whether protocols within a proximal region are 802.11x protocols (e.g., 802.11b, 802.11a, 802.11g, or 802.11n) that are similar. *See id.* at Abstr., ¶¶ 14, 51, 53. If the protocols are not similar, such as if a device is using a legacy protocol, and another device is using a newer protocol, devices that wish to transmit a MAC frame will use a legacy protocol to create a “legacy portion” of a set-up PHY preamble in the MAC frame. *Id.* at ¶ 14, 51, 53. In this way, even if a legacy device is not able to interpret the entire frame, the transmission, based on the “legacy portion,” is recognized as a frame and the legacy device will avoid collision with the newer 802.11n communication. *Id.*

D. Reasonable Likelihood Analysis of Giaimo-based grounds

Petitioner asserts that the instant proceeding involves “three different types of overlay networks”: “infrastructure/ad-hoc overlays,” “802.11/802.15 overlays,” and “802.11b/g overlays.” Pet. 78. Because of the complexity of the challenges presented and considering the arguments presented by Patent Owner at this juncture, we focus our discussion of the merits of the Petition with respect to the grounds based on the Giaimo and Sinivaara combination. The remaining grounds will be addressed in less detail and only insofar Patent Owner has raised an issue of potential impact.

1. The Giaimo/Sinivaara Combination

According to Petitioner, Giaimo discloses hubs that optimize bandwidth usage for forwarding data between an infrastructure network (the first wireless network) and an ad hoc network (a second wireless network). Pet. 35. According to Petitioner, the embodiment of Figure 5 of Giaimo, reproduced below, shows a hub linked to a first wireless device (an AP) using the infrastructure mode or first wireless connection, while also linked to a personal computer using an ad hoc mode or second wireless connection. *See id.* at 40.

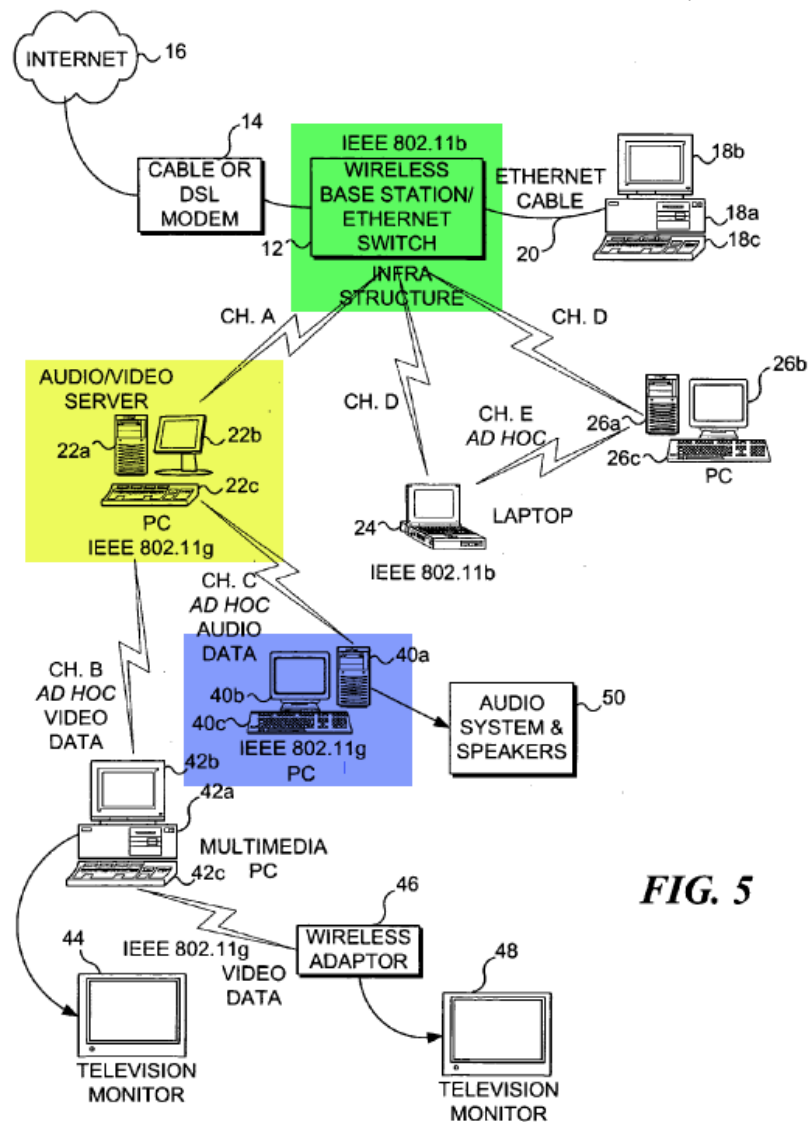


FIG. 5

Figure 5 of *Giaimo* has been revised to highlight the hub (in yellow), the AP (in green) and the personal computer (in blue). Petitioner points out that the hub (*Giaimo*'s audio/server 22) could have multiple wireless devices and its processor executes the smart routing logic that allows it to control the radios and forward the data between the wireless circuits. *Id.* at 41–45. *Giaimo* describes that its devices are not limited to personal computers, and that the wireless network could include any device suitable for communication over a wireless network, such as telephone handsets. Ex. 1008 ¶ 47.

According to Petitioner, a person of ordinary skill in the art would have been motivated to modify Giaimo's ad hoc protocol with the teachings of Sinivaara. Pet. 36–37. Sinivaara teaches specific modifications that result in reduced power consumption, thereby permitting one or more of the ad hoc devices to save power. *Id.* at 37 (citing Ex. 1007, 7:31–8:7; Ex. 1008 ¶¶ 14–27). Petitioner asserts that power saving would have been particularly useful in times of reduced or no media streaming between Giaimo's devices. *Id.* (citing Ding Decl. ¶¶ 112–114). Petitioner also asserts that the Giaimo's forwarding nodes, such as the audio/media server 22, effectively route packets from a first wireless network to a second wireless network—thereby extending the range of the wireless network coverage without negatively affecting battery life of the mobile nodes on the second network. *Id.* (citing Ding Decl. ¶ 109). According to Petitioner, preserving battery life is always a focus on the market for mobile devices such as those in Giaimo and Sinivaara. *Id.* at 38 (citing Ding Decl. ¶ 119).

Patent Owner argues that a person of ordinary skill in the art would not have been motivated to combine the teachings of Giaimo and Sinivaara. Prelim. Resp. 37–39. According to Patent Owner, Sinivaara's modifications to the transmissions would result in decrease performance of Giaimo's system because the radio range of the ad hoc connections would be compromised. *Id.* at 38 (citing Ex. 1007, 7:31–32). Because quality of service is important to Giaimo, and Sinivaara discards link quality analysis, Patent Owner posits that Petitioner asks too much: disregard Giaimo's entire purpose to “force-fit Sinivaara's teachings in Giaimo's system.” *Id.* Thus, we see this argument as alleging that Petitioner's proposed combination of teachings would amount to either Giaimo not working for its intended

purpose, or presenting such disadvantages that a person of ordinary skill in the art would be dissuaded from making the combination.

At this juncture we are not persuaded by Patent Owner's arguments. There is no persuasive evidence, supported by facts, in the current record that the asserted combination would frustrate the purpose of Giaimo's system or that Giaimo would not work as intended. Nor are we persuaded, at this juncture, that any tradeoffs resulting in the application of Sinivaara's technique would be so disadvantageous that a person of ordinary skill in the art would reject the stated benefits. Rather, we are informed on the present record by the express teaching of a realized benefit of power savings in Sinivaara and the recognition that a person of ordinary skill in the art is aware of the significance of such savings in a network of mobile devices as testified to by Dr. Ding. The relevant inquiry is whether or not a person having ordinary skill in the art would be motivated to combine references despite drawbacks that the combination might present. *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 (Fed. Cir. 2000). At this juncture, weighing the drawbacks argued by Patent Owner against the benefits of the modification supported by evidence of record leads us to conclude that there is merit to Petitioner's asserted rationale to combine.

Patent Owner presents another argument against the motivation to combine Giaimo and Sinivaara's teachings. Prelim. Resp. 39. According to Patent Owner, Sinivaara's technique involves the modification of beacon intervals and formats. *Id.* Such a modification, the argument goes, would "greatly—and needlessly—complicate Giaimo's system by requiring modification of the 802.11 MAC layer on all devices intended to be used in ad hoc mode." *Id.* (citing Ex. 1008 ¶ 67). We find Patent Owner's

argument unpersuasive at this juncture. We recognize that Giaimo states its technique is implemented without any hardware modification. Ex. 1008 ¶ 54. So, an allegation that a hardware modification would be needed would run counter to Giaimo's teachings. However, we have been shown no persuasive evidence, with supporting facts, that puts Sinivaara's technique in the realm of a hardware modification. Rather, Petitioner alleges, with supporting testimony from Dr. Ding, that the technique of Sinivaara would be implemented by using known programming techniques. Pet. 38; Ding Decl. ¶¶ 118–120.

Consequently, we are not persuaded by Patent Owner's arguments that the reasons to combine the teachings of Giaimo and Sinivaara on the present record lack merit. Having reviewed the record before us, we are persuaded that Petitioner's arguments and evidence reasonably show it would have been obvious to combine the teachings of Giaimo and Sinivaara to yield a hub implementing the power saving techniques of Sinivaara.

2. *Connections that can be maintained, at times, simultaneously with each other in a common wireless space*

Claim 1 of the '814 patent requires the functionality of maintaining two connections, at times simultaneously with each other, using two protocols, the first wireless network protocol and the second network wireless protocol. Petitioner addresses the simultaneously maintained connections by pointing out that Giaimo's hub remains associated with the AP while creating a new independent ad hoc connection. Pet. 46–47 (citing Ex. 1008 ¶¶ 8, 16, 17, 52, Fig. 1b; Ding Decl. ¶¶ 136–138). According to Petitioner, the structure of the logic required by the claim limitation is identical or at least equivalent to the structure disclosed in the '814 patent as

performing the recited function. *Id.* at 47 (citing Ding Decl. ¶ 136). In particular, we note that Giaimo specifically describes “simultaneous maintenance of two wireless connections on two independent channels in the first wireless client device with Smart Wireless Routing.” Ex. 1008 ¶ 17. And Giaimo further provides for simultaneous, but separate ad hoc connections being maintained by equipping the client/media server with two wireless devices. *Id.* ¶ 52.

Patent Owner argues that there are no simultaneous connections in Giaimo as required by the claim. Prelim. Resp. 35–36. In particular, Patent Owner asserts that under the 802.11 specification, with which Giaimo is consistent, an 802.11 STA cannot be in both 802.11 ad hoc mode and 802.11 infrastructure mode, “at times, simultaneously.” *Id.* at 35 (citing Ex. 1017, 23–24; Ex. 1008 ¶¶ 15, 50, 57. Patent Owner recognizes that Giaimo explicitly states that the device remains associated with the AP while creating a new ad hoc connection. *Id.* at 36 (explaining paragraph 16 of Giaimo). That passage, however, the argument goes, does not mean that Giaimo is able to simultaneously maintain both connections as the claim requires. *Id.* According to Patent Owner, when a device is in ad hoc mode, it cannot maintain any connection with other nodes because a STA in ad hoc mode has no association capability. *Id.* (citing Ex. 1017, 25).

The argument is not persuasive at this juncture. Giaimo is explicit in stating that it “provides for simultaneous maintenance of two wireless connections on two independent channels in the first wireless client device with Smart Wireless Routing.” Ex. 1008, ¶ 17. This “maintenance” of the two “connections” is effectuated by maintaining one channel in infrastructure mode and another channel in ad hoc mode. *Id.* Patent

Owner's argument focuses on other parts of Giaimo and does not explain how this particular clear description of simultaneously maintaining connections in ad hoc and infrastructure modes is not credible. At this juncture, there is some evidence tending to show that a device using a single channel may not maintain an ad hoc mode and infrastructure mode connection simultaneously. Ex. 1017, 66 (describing the capability information field). However, Giaimo's technique utilizes different channels for each connection. Ex. 1008 ¶ 17. And in some embodiments, the device has multiple wireless transceivers to maintain connections with other devices simultaneously and in different channels. *Id.* ¶¶ 50, 52.

Accordingly, Patent Owner's arguments focusing on the 802.11 standard's non-capability of simultaneous ad hoc and infrastructure mode connections is not persuasive. We have reviewed Petitioner's argument and evidence and have weighed it in light of Patent Owner's information presented in the response. We determine that Petitioner has met its burden of showing that Giaimo teaches the simultaneously maintaining connection limitation discussed above.

3. *The Overlay Protocol Limitation*

We now turn to the "overlay protocol limitation." The claim states that the second wireless network protocol is an "overlay protocol" with respect to the first wireless network protocol in that communications using the second wireless network protocol are partially consistent with the first network protocol. As noted *supra* in Section III.B.1., we apply here the definition of "overlay protocol" as follows: protocol governing a second network, which protocol has aspects in common with a first network

protocol to reduce interference such that the second and first network can co-exist.

a) Partially Consistent

The plain meaning of the claim language requires that the first wireless network protocol and the second wireless network protocol are partially consistent. The Petition states that Giaimo's ad hoc network is an overlay of the infrastructure network "in that ad-hoc communications are partially consistent with infrastructure communications." Pet. 47 (citing Ding Decl. ¶¶ 141, 142). According to Petitioner, because the ad hoc and infrastructure networks fall under the 802.11 specification, they "reuse the common elements in the original 802.11 specification." *Id.* Petitioner, through testimony of Dr. Ding, asserts that both networks can use consistent frequencies and common wireless space and coordinate the use of the common RF spectrum with Giaimo's "smart logic," as well as the common use of IEEE 802.11 beacon frames. *Id.*; Ding Decl. ¶¶ 141–142. In addition to the consistencies, Petitioner points out various "inconsistencies" between the ad hoc and infrastructure networks of Giaimo. *See, e.g.*, Pet. 49 (citing Ex. 1008 ¶¶ 12, 16, 19 and describing different quality of service properties between them). We agree that Petitioner has shown partially consistent elements of the protocols involved in the ad hoc and infrastructure networks, such as the coordinated use of the RF spectrum, which at a minimum seems to include collision avoidance.

Patent Owner argues that the 802.11 protocol in ad hoc mode and the 802.11 protocol in infrastructure mode are not two different protocols—they are part of the same 802.11 standard. Prelim. Resp. 33. According to Patent

Owner, “nowhere does the 802.11 specification state that ad hoc mode is an overlay protocol with respect to infrastructure mode.” *Id.*

We are not persuaded by this argument. First, Patent Owner has not presented a persuasive claim construction argument that the recited “protocol” excludes a set of conventions for communication within a protocol, so as to exclude distinct network modes of communication specified in the 802.11 specification. For instance, arguing that the two recited protocols must be “different” is insufficient, given the claim requirement that they are also “partially consistent.” Furthermore, the ’814 patent specification describes an example of the secondary network protocol (read here also “overlay protocol”) as 802.11x frames with new frame arrangements, and describes an example of the primary network as an 802.11x network, thereby using any of the available protocols in that standard. Ex. 1001, 10:5–7, 11:42–46. Second, there is no persuasive evidence showing that the set of conventions for ad hoc mode communications (or those for infrastructure mode communications) cannot constitute a protocol, merely because they are part of the 802.11 specification. Nevertheless, the parties are invited to develop further the meaning of the word “protocol” as that term is known to those skilled in the art and in the context of the ’814 specification.

b) Aspects in common . . . to reduce interference such that the second and first network can co-exist

The Petition states that “each of these networks is consistent in part with the other because they reuse the common elements in the original 802.11 specification.” Pet. 47. The Petition further states that “[t]hese common elements also allow for a reduction in interference.” *Id.* According to Petitioner, the “smart logic” of Giaimo “enhances 802.11 to reduce

interference and permit co-existence by utilizing common aspects of the protocols, such as beacon frames, to assign channels and prevent overlapping transmissions.” *Id.* at 48 (citing Ex. 1007, 8:32–9:35; Ex. 1008, Figs. 6–16, ¶¶ 58–79; Ding Decl. ¶ 142). As we understand Petitioner’s assertions, Giaimo teaches that the common aspects of beacon frames accomplish the benefit that the “overlay protocol” construction requires: reduce interference such that the second and first network can co-exist. Dr. Ding explains that the 802.11 beacon frames in each network assign channels and prevent overlapping transmissions. Ding. Decl. ¶ 142. We are persuaded at this juncture that Petitioner’s assertions and Dr. Ding’s testimony fairly show that the beacon frames of the two networks reduce interference by preventing overlapping transmissions and this results in the co-existence of these two networks.

Patent Owner does not address the Petition’s reliance on Giaimo’s beacons as described above. Instead, Patent Owner focuses on Sinivaara, arguing that modified beacons neither aim for nor achieve the interference and co-existence goals of the “overlay protocol.” Prelim. Resp. 39. Patent Owner concludes then that Sinivaara’s methods “do not constitute an overlay protocol as defined by the [c]ourt.” *Id.*

We are not persuaded by Patent Owner’s argument chiefly because it does not address the challenge of unpatentability presented in the Petition. We recognize that Petitioner relies on Sinivaara’s modified 802.11 beacons as teaching a partially compliant network. Pet. 49–50; Ding Decl. ¶ 144. We do not see in the Petition where Sinivaara is relied on for the aspects in common to the ad hoc and infrastructure networks as required by the “overlay protocol” construction. In any event, Sinivaara’s technique results

in lower power consumption and more time in power save mode. Ex. 1007, 3:24–26. This benefit seems consistent with the ’814 patent specification, which describes the protocol of the secondary network as minimizing power dissipation and minimizing wireless medium occupancy. Ex. 1001, 12:20–23. It appears reasonable, at this juncture, to conclude that the power saving mode brought by the use Sinivaara’s technique results in devices that spend more time in sleep mode, thereby reducing the interference that would occur if they were otherwise active in the wireless medium.

Consequently, we determine that the Petition reasonably shows at this juncture that Giaimo’s protocol (alone or modified by Sinivaara) teaches the “overlay protocol” as construed.

4. *Remaining Limitations and Conclusion of Claim 1*

The Petition provides a limitation-by-limitation explanation for the remaining elements of the claim. For instance, the Petition argues that Giaimo’s antennas are 802.11 “frequency agile” antennas and their operation on all the RF frequencies for the 802.11 standard would impinge on the proximate antennas. Pet. 50 (discussing the limitation labeled 1.d: “at least some of the communications using the second wireless network protocol impinge on at least some antennae used for the first wireless network”). The Petition also argues that Giaimo discloses a hub that routes data from one wireless network to the other, thus teaching the “data forwarding logic” limitation. *Id.* at 51–53 (also relying on Sinivaara’s IP addressing). Patent Owner does not present argument pertaining to the remaining limitations of claim 1.

Having reviewed the argument and evidence presented in the Petition for the limitations of claim 1 addressed in detail above and the further

limitations, and after evaluating the Patent Owner's arguments, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on its assertion that claim 1 would have been obvious over Giaimo and Sinivaara.

5. *Dependent Claims 4, 7, 8*

For each of dependent claims 4, 7, and 8, Petitioner relies on its arguments and evidence presented for claim 1. For example, claim 4 requires that the first wireless network protocol is an 802.11x wireless protocol and the second wireless network protocol is a modification of the 802.11x wireless protocol that is not entirely compliant with the 802.11x wireless protocol of the first wireless network but can be maintained in a common wireless space as the 802.11x wireless protocol. Petitioner refers back to the entire briefing of claim 1 and the Ding Declaration at paragraph 157, which seems nonsensical in that it refers to the Bluetooth protocol. Pet. 53–54. We gather from the scant explanation for this particular claim that Petitioner equates one protocol to the infrastructure mode (802.11a/b/g) and the other protocol to the ad hoc network with Sinivaara's modifications. Patent Owner does not present separate argument for this claim. Considering our analysis discussed above for claim 1, of the ad hoc and infrastructure networks as being both part of the 802.11 specification, we find reasonable at this juncture that this claim would have been obvious over Giaimo and Sinivaara.

Claim 7 of the '814 patent requires that the wireless radio circuit and the logic for processing data are configured to allow the network-enabled hub to transmit on more than one radio band. Petitioner again refers back to the analysis presented for claim 1, alluding to "any 802.11 RF frequency in

Tables 4 and/or 5.” Pet. 54. Giaimo states that different countries employ different frequency ranges for the 2.4 GHz frequency band as shown in Table 4. Ex. 1008 ¶ 61. Giaimo also states that different countries or regions employ different frequency ranges in the 5 GHz frequency bands as shown in Table 5. *Id.* ¶ 62. Referring to these tables alone is insufficient to show what claim 7 requires. However, in the discussion of Giaimo’s antennas for limitation 1.d, discussed above in Section III.D.4, the Petition states that Giaimo’s 802.11 RF “frequency agile” antennas can operate on every possible 802.11 RF channel within the frequency bands of 2.4 GHz and 5GHz. Pet. 50. Patent Owner does not present separate argument regarding claim 7. After evaluating the Petition’s statements in light of Giaimo’s disclosures discussed above, we determine that at this juncture Petitioner has demonstrated a reasonable likelihood of prevailing in showing unpatentability of this claim.

Claim 8 recites “wherein the wireless radio circuit and the logic for processing data are configured to allow the network-enabled hub to alternate connectivity between the first wireless network connection and the second wireless connection.” The Petition states that Giaimo alternates between infrastructure and ad hoc networks automatically. Pet. 54 (citing Ex. 1008 ¶¶ 14, 21, 55–57, Fig. 8). Patent Owner does not present separate argument regarding claim 8. We are persuaded by the arguments and evidence presented in the Petition, on the present record. Giaimo states that a user does not have to “manually selectively operate” a wireless device in a particular mode when communicating with another wireless device because Giaimo’s device “automatically facilitates the communication protocol between two wireless devices when needed.” Ex. 1008 ¶ 14. Giaimo further

explains that the wireless devices “selectively switch[]” between operation in the ad hoc mode and the infrastructure mode. *Id.* ¶ 55. If the first network is the infrastructure network and the second network is the ad hoc connection, then Giaimo’s automatic switching between the two modes satisfies the further limitation of claim 8.

In conclusion, after reviewing the Petition and the evidence presented in light of Patent Owner’s preliminary response we determine that Petitioner has shown a reasonable likelihood of prevailing on its assertion that claims 4, 7, and 8 of the ’814 patent would have been obvious over Giaimo and Sinivaara.

E. Evaluation of Remaining Grounds

Because we have found a reasonable likelihood of prevailing with respect to the Giaimo-based grounds, we will address the remaining grounds briefly to address Patent Owner’s arguments. We begin with the stronger of the two grounds, those based on Gurevich.

1. Gurevich, Hansen, 802.11 b/g Standards

This ground involves the assertion that Gurevich’s general client (GC) facilitates communications between different networks using virtual interfaces implemented as software drivers. Pet. 61–66. In this ground, Petitioner relies on the first protocol being an infrastructure network of the 802.11b specification and the second or “overlay protocol” being an ad hoc network or an 802.11g compliant network. Pet. 67–68. More specifically, Petitioner argues that one protocol may be 802.11b and the second network protocol may be 802.11g. *Id.* at 69.

As for whether these protocols are partially consistent, Petitioner relies on the SERVICE field of both the 802.11g and 802.11b networks. *Id.*

In the 802.11b network, there is a long physical layer protocol data unit (PPDU) that supports the high data rate of 802.11b. *Id.* at 69–70. Yet the 802.11g network, although also using a long PPDU preamble, has specific options in certain bit fields that the 802.11b protocol does not support. *Id.* at 70. Petitioner also relies on other, technically complex explanations about certain fields and their modulations that are partially consistent between the 802.11b/g standards to argue that if all the devices can transmit a preamble consistent with both standards, both can decode the preamble to determine that the wireless medium is occupied, even though some devices may not be able to decode the payload. *Id.* at 70–71.

Patent Owner argues that 802.11g and 802.11b are merely amendments of the same 802.11-1999 standard. Prelim. Resp. 40–41. As such, according to Patent Owner, neither is an “overlay protocol.” *Id.* This argument is not persuasive for the same reasons as discussed above with respect to the Giaimo-based grounds. *See supra* § III.D.3.a.

Patent Owner further argues that Gurevich’s connections in the virtual interfaces are not simultaneously maintained connections as required by claim 1. Prelim. Resp. 42–44. According to Patent Owner, Petitioner’s theory relies on a modification of Gurevich to implement an 802.11b modulation for one connection and an 802.11g modulation for another connection, yet Gurevich uses one physical interface that cannot physically maintain two connections simultaneously. *Id.* at 43. That is, with a single radio, Gurevich’s device can maintain one connection at a time, regardless of how many virtual interfaces are instantiated simultaneously. *Id.* at 43–44. The argument is unpersuasive on the present record because Gurevich expressly states that it uses a single physical interface card to

“simultaneously communicate with peers in ad-hoc, infrastructure, WDS, and any other networks.” Ex. 1010 ¶ 65; Pet. 67–68. To the extent Patent Owner contends that Gurevich’s simultaneous communication is different from the ’814 patent’s simultaneous connection, we invite further briefing about what claim language, properly construed, would allow for such a distinction. At this juncture, however, we do not see a technical difference between the two.

2. *Sugar, Shin, Bluetooth*

Petitioner relies on combinations of Sugar, Shin, and the Bluetooth standard as teaching the limitations of claim 1. In particular, Petitioner points to Sugar’s MPD as the claimed hub, with modulators, processor and RF front end to communicate simultaneously with Bluetooth and WLAN terminals. Pet. 12–22. As discussed below, we have doubts that the challenge presented in the Petition rises to the reasonable likelihood threshold required for institution.

a) *Partially Consistent and “overlay protocol”*

For the “partially consistent” limitation, Petitioner describes four reasons for why the Bluetooth and the 802.11 standards have aspects in common and aspects not in common. First, Petitioner alleges that Sugar modifies the Bluetooth protocol by adding a DIFS rule from the 802.11 standard, thereby having the DIFS rule in common. Pet. 23. Second, Petitioner alleges that Sugar modifies the Bluetooth protocol “by adding CTS/RTS ‘guard packets’ from 802.11 to reduce collisions.” *Id.* Third, Petitioner alleges that both networks use a 48-bit address. *Id.* at 24. And fourth, Petitioner alleges that Bluetooth and 802.11 operate in consistent RF frequencies. *Id.*

Patent Owner argues that Sugar does not modify the Bluetooth protocol as alleged by Petitioner. Prelim. Resp. 26–27. Specifically, Patent Owner argues that Sugar’s MPD arbitrates which of the terminals present may operate at any given time. *Id.* For instance, Sugar teaches gathering data from a Bluetooth terminal and data from an 802.11 terminal to determine when to pass along a packet for transmission to those terminals based on an algorithm at the controller, not by modification of any of the Bluetooth or 802.11 protocols. *Id.* at 27–28 (citing Ex. 1004 ¶¶ 46, 94–106, Figs. 17A–17B).

We agree with Patent Owner, at this juncture, that Sugar does not seem to modify the Bluetooth protocol to include a DIFS rule from the 802.11 network. Sugar describes its MPD exchanging data with Bluetooth terminals using the ACL link by queuing the Bluetooth ACL packets, identifying the transmit frequency band, and monitoring the traffic in the 802.11 network. Ex. 1004 ¶¶ 93–96. In this manner, Sugar determines when it should transmit the Bluetooth ACL packets free of interference from the 802.11 network, by waiting for a certain amount of idle time in that network. *Id.* Sugar’s Bluetooth terminals, however, seem to transmit the ACL packets consistent with the standard Bluetooth protocol. The algorithm that allows the Bluetooth packets to be transmitted without interference is a delay algorithm within the controller of the MPD, without disclosing any change to the Bluetooth protocol (or to the 802.11 standard for that matter). *Id.* Figs. 17A–17B.

As for the second of Petitioner’s allegation concerning the “guard packet,” we also are persuaded by Patent Owner at this juncture, that Sugar does not modify the Bluetooth protocol as alleged in the Petition. Sugar’s

MPD uses a “guard packet” to put the 802.11 network devices in listening mode, so they don’t transmit at the same time the MPD is transmitting Bluetooth SCO packets, which will have priority in the Sugar network.

Ex. 1004 ¶¶ 84–92. Sugar does not appear to describe modifying in any way the Bluetooth SCO transmissions or its protocol to implement this “guard packet” technique. To the contrary, Sugar appears to describe SCO packet (and ACL packet) delivery according to the Bluetooth specification current at the time. *Id.* ¶¶ 78–83.

Therefore, neither the first nor the second of Petitioner’s allegations—that Sugar modifies the Bluetooth protocol to constitute a protocol “partially consistent” with the WLAN protocol—is supported by the present record.

The third and fourth allegations of “partially consistent” aspects also appear flawed, but for different reasons. Patent Owner argues that the mere fact that 802.11 and Bluetooth both use 48-bit MAC addresses or that both have a common RF band does not make the Bluetooth protocol an “overlay protocol” of the 802.11 protocol. Prelim. Resp. 29–30. We are persuaded by Patent Owner’s arguments at this juncture, because under the “overlay protocol” construction, the common aspects of using a 48-bit address or having the same RF frequency, alone, say nothing about the benefits gained by their commonality, i.e., that they help reduce interference so the two networks can co-exist. As for the Petition’s argument that 48-bit-address use avoids the overhead associated with dynamically assigning and processing different types of addresses, we are unpersuaded at this juncture. That bare explanation seems untethered to the benefits that the “overlay protocol” is meant to address. We note that the ’814 patent describes the interference problems between the Bluetooth and 802.11 protocols, and

Bluetooth was using a 48-bit address there as well. Furthermore, the '814 patent describes explicitly the problem of Bluetooth and 802.11 networks unable to co-exist because they occupy the same frequency band without synchronization with each other. Ex. 1001, 2:25–44. In short, none of the alleged modifications or common aspects between the Bluetooth and 802.11 network protocols disclosed in Sugar seem to meet the overlay protocol limitation of claim 1.

b) Reasons to Combine

Finally, we address the alleged reasons to combine the teachings of Sugar and Shin. Petitioner proposes a combination of Sugar's MPD with Shin's IP addressing and routing techniques that use the OSI layer model stack. Pet. 13–14. The Petition alleges that Sugar's teachings of improving the co-existence of networks would motivate the implementation of Shin's techniques. *Id.* at 13. Dr. Ding's testimony does not expand on this motivation. Ding Decl. ¶ 39. Petitioner then alleges the inverse, that the express teachings of Shin would motivate a person of ordinary skill in the art to use Shin's techniques of providing the ability to address and route data between the networks. Pet. 13. Again Dr. Ding's testimony does not expand on this motivation. Ding. Decl. ¶ 39.

At this juncture, these statements are insufficient to show obviousness. Referring to a general benefit of co-existence of networks does not explain why a person of ordinary skill in the art would have made use of the IP routing logic of Shin with Sugar's MPD. The testimony is also conclusory as to this point, providing no description of why a reference that already solves the problem of co-existence between Bluetooth and 802.11 networks (Sugar) would need to be enhanced or improved further for co-

existence by using Shin's technique. The testimony likewise does not explain why Shin's compound terminal, already able to communicate with a device in overlapping Bluetooth and 802.11 networks would be enhanced or improved by Sugar's methods featuring the MPD algorithms that delay packet transmissions or use notch filtering to avoid interfering communications.

The Petition furthermore asserts that a person of ordinary skill in the art would have combined the references using known methods to yield predictable results. Pet. 13. The explanations provided focus on Shin's techniques being capable of being implemented in Sugar, because Shin's techniques can be predictably programmed in Sugar's processor. *Id.* Similar statements are provided for the predictable implementation of Sugar's techniques in a processor of Shin. *Id.* But in essence, these explanations proffer the contention that an algorithm can be implemented in a processor, without explaining why a person would implement those algorithms in the first place. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) ("obviousness concerns whether a skilled artisan not only could have made but would have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention").

Finally, Petitioner states that "[d]esign incentives and market forces would have motivated a POSITA to combine the references to support IP routing, which was a basic networking functionality at the time, and to improve co-existence, which was a known goal in the art." Pet. 14. This explanation is not sufficient at this juncture to explain why a person of ordinary skill in the art would have combined the teachings as alleged by

Petitioner. Dr. Ding’s testimony is just as conclusory. Ding Decl. ¶ 41. At best, the Petition asserts that improving co-existence presents a problem that the designers of wireless networks may have been trying to solve. But that alone does not explain what design incentive or market force specifically exists to look for IP routing logic. Nor does the statement explain what design incentive or market force specifically motivates a person of ordinary skill in the art “to improve co-existence” as alleged in the combination of teachings. Generally pointing to “improving co-existence” does not explain why or how the combination of the specific teachings of Sugar and Shin that Petitioner relies on would be the result. *See Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1068–69 (Fed. Cir. 2018) (finding problematic that “the Board focused on what a skilled artisan would have been able to do, rather than what a skilled artisan would have been *motivated* to do at the time of the invention.”); *see also InTouch Technologies, Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327 (Fed. Cir. 2014) (“It appears that [the expert] relied on the . . . patent itself as her roadmap for putting what she referred to as pieces of a ‘jigsaw puzzle’ together.”); *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983) (“To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.”).

IV. CONCLUSION

As explained above, we determine that Petitioner demonstrates a reasonable likelihood of prevailing on its challenge of claims 1, 4, 7, and 8 as unpatentable on the ground based on the combination of Giaimo and Sinivaara. Accordingly, we institute review on all challenged claims and grounds as asserted in the Petition. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

Our determination in this Decision is not a final determination on the patentability of any challenged claims and, thus, leaves undecided any factual issues necessary to determine whether sufficient evidence supports Petitioner’s contentions by a preponderance of the evidence in the final written decision. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that “there is a significant difference between a petitioner’s burden to establish a ‘reasonable likelihood of success’ at institution, and actually proving invalidity by a preponderance of the evidence at trial”) (quoting 35 U.S.C. § 314(a) and comparing § 316(e)).

V. ORDER

In consideration of the foregoing, it is hereby
ORDERED that pursuant to 35 U.S.C. § 314(a) the Petition is granted;
and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of the '814 patent is hereby instituted with trial commencing on the entry date of this decision, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of review.

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