

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner,

v.

XR COMMUNICATIONS LLC d/b/a VIVATO TECHNOLOGIES,
Patent Owner.

Case IPR2018-00763
Patent 7,729,728 B2

Before BARBARA A. PARVIS, TERRENCE W. McMILLIN, and
JAMES J. MAYBERRY, *Administrative Patent Judges*.

McMILLIN, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining that the Challenged Claim is Unpatentable
Denying Patent Owner's Motion to Amend
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Cisco Systems, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) to institute an *inter partes* review of claim 16 of U.S. Patent No. 7,729,728 B2 (Ex. 1001, “the ’728 patent”). XR Communications LLC d/b/a Vivato Technologies (“Patent Owner”), filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). We instituted this review. Paper 15 (“Inst. Dec.”).

Subsequent to institution, Patent Owner filed a Response. Paper 15 (“PO Resp.”). Petitioner filed a Reply. Paper 24 (“Reply”). Patent Owner filed a Sur-Reply. Paper 27 (“Sur-Reply”). Oral argument was held on July 18, 2019, and a transcript was entered into the record. Paper 37 (Tr.).

Patent Owner also filed a Motion to Amend. Paper 16 (“Mot. to Amd.”). Petitioner filed an Opposition. Paper 25 (“MTA Opp.”). Patent Owner filed a Reply in Support of its Motion to Amend. Paper 28 (“MTA Reply”). Petitioner filed a Sur-Reply to Patent Owner’s Reply. Paper 32 (“MTA Sur-Reply”).

This Final Written Decision is entered pursuant to 35 U.S.C. §318(a) and 37 C.F.R. §42.73. After reviewing the arguments and evidence, we conclude that Petitioner has met its burden of showing, by a preponderance of the evidence, that claim 16 of the ’728 patent is unpatentable. And, we deny the Motion to Amend.

A. *Related Matters*

The parties indicate that the ’728 patent has been asserted in the following litigations:

XR Communications, LLC d/b/a Vivato Technologies v. ARRIS International plc, 8-18-cv-00192 (C.D. Cal.), filed February 2, 2018; *XR Communications, LLC d/b/a Vivato Technologies v. Aruba Networks, Inc.*, 2-17-cv-02945 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC*

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d/b/a Vivato Technologies v. Newo Corporation d/b/a Amped Wireless, 5-17-cv-00744 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. ASUS Computer International*, 2-17-cv-02948 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Cisco Systems, Inc.*, 2-17-cv-02951 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Extreme Networks, Inc.*, 2-17-cv-02953 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. NETGEAR, Inc.*, 2-17-cv-02959 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Ruckus Wireless, Inc.*, 2-17-cv-02961 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Ubiquiti Networks, Inc.*, 2-17-cv-02968 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Belkin International, Inc.*, 8-17-cv-00674 (C.D. Cal.), filed April 13, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. D-Link Systems, Inc.*, 8-17-cv-00596 (C.D. Cal.), filed April 3, 2017; and *XR Communications, LLC d/b/a Vivato Technologies v. Xirrus, Inc.*, 3-17-cv-00675 (C.D. Cal.), filed April 3, 2017. Pet. 7–8; Paper 4, 2–4.

Claim 16 of the '728 patent is also challenged in IPR2018-00726 and IPR2018-01018. A Final Written Decision (Paper 38) was entered in IPR2018-00726 on October 1, 2019, in which it was concluded that claim 16 of the '728 patent was unpatentable over a combination of two references not asserted in this proceeding. IPR2018-01018 is pending.

The '728 patent issued from a continuation of the application from which US 7,062,296 B2 issued. US 7,062,296 B2 is challenged in IPR2018-00725, IPR2018-00764, and IPR2018-01017. A Final Written Decision (Paper 42) was entered in IPR2018-00725 on September 4, 2019. A Final

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Written Decision (Paper 46) was entered in IPR2018-00764 on September 16, 2019. IPR2018-01017 is pending.

B. The '728 Patent

The '728 patent is titled, "Forced Beam Switching in Wireless Communication Systems Having Smart Antennas." Ex. 1001, at code (54). The '728 Patent is directed to a method and apparatus for allowing a wireless communication system using a smart antenna to cause a receiving device to switch from one transmitted beam to another transmitted beam. Ex. 1001, 1:15–20. According to the '728 Patent, in wireless communications that use smart antennas, a receiving device has difficulty switching from one beam to another beam because the smart antenna produces narrower, directed beams as compared to conventional, omni-directional antennas. *Id.* at 2:25–31.

Figure 1 of the '728 Patent is reproduced below.

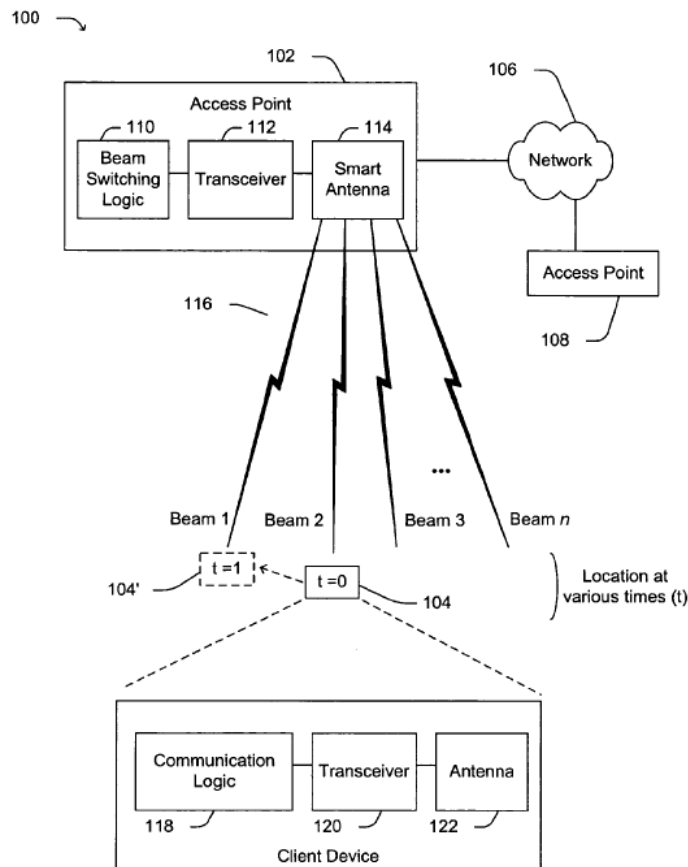


Fig. 1

Figure 1 depicts a block diagram of wireless communications system 100 having access point 102 in communication with client 104 over one of main beams 116. Ex. 1001, 5:1–3. As shown in Figure 1, access point 102 includes beam switching logic 110, smart antenna 114, and transceiver 112, which is coupled to switching logic 110 and smart antenna 114. *Id.* at 5:3–6, Fig. 1. Smart antenna 114 transmits main beams 116 in correspondence with transmit signals output by transceiver 112 and receives signals transmitted by client 104. *Id.* at 5:6–16.

Access point 102 is configured to cause receiving client 104 to switch between main beams 116. *Id.* at 4:61–65. In particular, beam switching logic 110 detects the location of client 104. *Id.* at 5:47–49. When beam

switching logic 110 determines that client 104 is associated with the “wrong beam,” beam switching logic 110 causes client 104 to re-associate with another one of main beams 116 by altering the operation of transceiver 112. *Id.* at 5:55–60.

C. Challenged Claim

Petitioner challenges claim 16 of the '728 patent. Pet. 21. Claim 16 recites:

16. A wireless communication system, comprising:

a phased array antenna configured to transmit beam downlinks;

a transceiver operatively coupled to the phased array antenna and configured to send and receive electromagnetic signals via the phased array antenna; and

an access point that includes the phased array antenna and the transceiver, the access point configured to:

selectively allow a receiving device to operatively associate with a beam downlink transmitted to the receiving device via the phased array antenna;

receive an uplink transmission from the receiving device through the phased array antenna;

determine from the uplink transmission if the receiving device should operatively associate with a different beam downlink transmission; and

at least one of: allow the receiving device to operatively associate with the different beam downlink if determined that the receiving device should operatively associate with the different beam downlink; force the receiving device to operatively associate with the different beam downlink if determined that the receiving device should be operatively associated with the different beam downlink;

wherein the access point is further configured to actively probe the receiving device by generating a signal to initiate that the phased array antenna transmit at least one downlink transmittable message over the beam downlinks, and gather signal parameter information from uplink transmittable messages received from the receiving device through the phased array antenna.

Ex. 1001, 12:25–55.

D. Cited Art

Petitioner relies on the following references:

Alastalo, US 2004/0066762 A1 (Ex. 1005); Antonio et al., US 6,208,858 B1 (Ex. 1006); and Jack H. Winters, WTEC Panel Report on Wireless Technologies and Information Networks, 53–58 (Chapter 6 “Smart Antennas”) (July 2000) (“WTEC Report”) (Ex. 1012).¹

The earliest priority date claimed for the ’728 patent is November 4, 2002, based on U.S. Provisional Application No. 60/423,660. Ex. 1001, at code (60), 1:7–15. Alastalo is based on a PCT application filed February 8, 2002. Ex. 1005, at code (22). Antonio issued on March 27, 2001. Ex. 1006, at code (45). The WTEC Report was published in July, 2000. Ex. 1012, 1. Patent Owner does not challenge the prior art status of any of the cited references. *See generally* Resp. At oral argument, the attorneys for the parties agreed there was no dispute that the cited references are prior art. Tr. 11:15–17 (Petitioner’s attorney); 15:1–2 (Patent Owner’s attorney). The cited references qualify as prior art to the ’728 patent.

¹ The WTEC Report has two sets of page numbers. In order to be consistent with Petitioner’s presentation, we shall refer to the original page numbers at the top of the pages.

E. Asserted Grounds of Unpatentability

Petitioner asserts that claim 16 of the '728 patent is unpatentable on the following grounds:

Claim Challenged	Statutory Basis	Reference(s)
16	§ 103 ²	Alastalo and Antonio
16	§ 103	Alastalo, Antonio, and the WTEC Report

Pet. 21.

In support of its contentions, Petitioner relies on declarations of Jack Winters Ph.D., Exhibits 1003 and 1025. Dr. Winters is a technical declarant retained for this proceeding. Ex. 1003 ¶ 1. In support of its contentions, Patent Owner relies on declarations of Robert Short, Ph.D., Exhibits 2002, 2005, and 2006. Dr. Short is a technical declarant retained by Patent Owner. Ex. 2002 ¶ 1.

II. ANALYSIS

A. Claim Construction

The Petition states, “Petitioner believes that, for purposes of this proceeding and the prior art assertions presented herein, the only term that ***might*** require construction is ‘phased array antenna.’” Pet. 17 (emphasis added). The Patent Owner’s Response states: “[t]he term ‘phased array antenna’ does not require construction in order to resolve the parties’ dispute.” Resp. 7. In the Response, Patent Owner further asserts that no claim construction is necessary. *Id.* And, in relation to its Motion to Amend, Patent Owner proposes no claim construction and asserts no claim

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §103. Because the '728 patent has an effective filing date before the effective date of the applicable AIA amendment, we refer to the pre-AIA version of 35 U.S.C. §103.

construction is necessary. Mot. to Amd. 15–16. Petitioner proposes no claim construction in its Opposition to the Motion to Amend. *See generally* MTA Opp. At oral argument, the attorneys for the parties agreed that there was no dispute regarding claim construction. Tr. 11:12–14 (Petitioner’s attorney); 15:1–2 (Patent Owner’s attorney). We determine that no terms require construction. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (stating that only those terms that are in controversy need to be expressly construed, and only to the extent necessary to resolve the controversy).

B. Legal Standards

A patent claim is unpatentable under 35 U.S.C. § 103 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) objective evidence of nonobviousness.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review

³ Neither party presents any objective evidence of nonobviousness or any related arguments for us to consider.

petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

C. Level of Skill in the Art

With regard to the level of ordinary skill in the art, Petitioner contends:

[A] Person of Ordinary Skill In The Art (“POSITA”) is someone knowledgeable concerning wireless communication systems employing beamforming technologies. That person would have (i) a master’s degree in electrical engineering, and (ii) two years of smart antenna design experience. Lack of work experience can be remedied by additional education, and vice versa.

Pet. 17 (citing Ex. 1003 (Winters Decl.) ¶ 18). In its Response, Patent Owner does not address this issue. *See generally* PO Resp. In its Motion to Amend, the Patent Owner states, “Patent Owner agrees with Petitioner’s expert that one of ordinary skill would be a person having a master’s degree in electrical engineering and two years of smart antenna design experience, wherein lack of work experience can be remedied by additional education and vice versa.” Mot. to Amd. 15 (citing Ex. 2006 (Short Decl.) ¶ 24). The attorneys for the parties agreed at the oral argument that there was no dispute regarding the level of ordinary skill in the art. Tr. 7:14–16 (Petitioner’s attorney); 14:25–15:1 (Patent Owner’s attorney). Based on the evidence and because it is consistent with the prior art of record, we adopt the level of ordinary skill in the art as proposed by the parties.

D. Asserted Obviousness of Claim 16 Based on Alastalo and Antonio

Petitioner challenges claim 16 as obvious in view of Alastalo and Antonio. Pet. 21, 23–62.

1. *Alastalo (Ex. 1005)*

Alastalo is directed to a wireless data communication system. Ex. 1005 ¶¶ 12, 15. “At least a part of the nodes of the data communication system may be arranged to provide an access point (AP) for the mobile terminal (MT). The access point may comprise appropriate transceiver and controller means such as those known from the base stations for the cellular telecommunication systems.” *Id.* ¶ 101. Figure 2 of *Alastalo* is reproduced below.

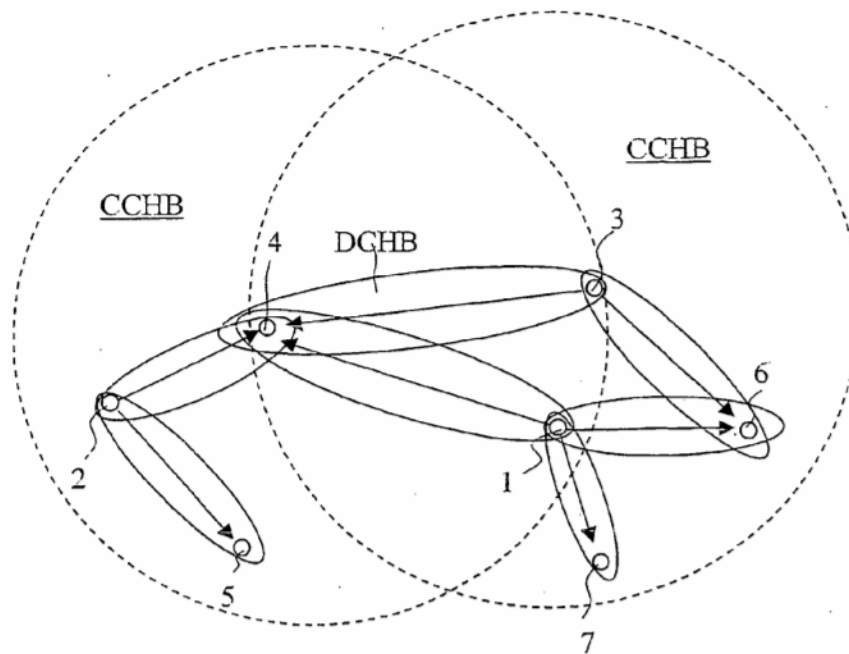


Fig. 2

Figure 2 depicts “data communication between neighboring nodes of a wireless data communication system.” *Id.* ¶ 18. “[T]he nodes are arranged to provide directional data communication between each other by means of directed data channel beams DCHB.” *Id.* ¶ 26. “The two circles drawn with dashed lines and designated by reference characters CCHB illustrate the substantially omnidirectional control channel radiation patterns about nodes 3 and 4.” *Id.* ¶ 25.

Figure 3 of Alastalo is reproduced below.

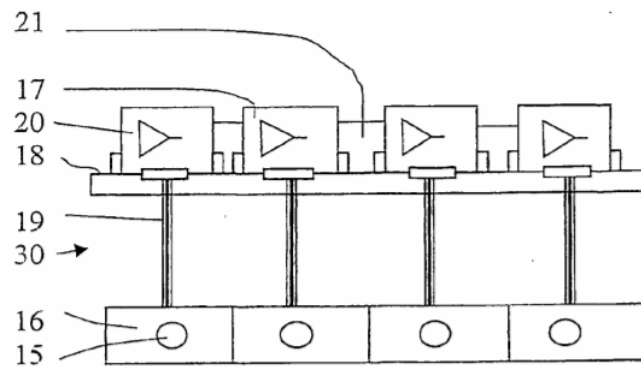


Fig. 3

Figure 3 depicts “a smart antenna arrangement 30 comprising four transmission branches.” *Id.* ¶ 31. “The beams i.e. radiation patterns produced by the array arrangement 30 can be shaped to have a narrower or broader radio coverage. Digital beamforming (DBF) can be advantageously employed in the provision of the directional beams.” *Id.* ¶ 33. With regard to digital beamforming, Alastalo states:

In the digital beamforming the transmission radiation pattern (beam) may be formed at the baseband by means of appropriate phasing and amplitude of the signal in each transmission branch. This may be accomplished by multiplying the complex digital samples in each transmission branch with a complex weight factor . . . The digital beam forming enables provision of different numbers of transmission and reception beams.

Id. ¶ 34.

2. Antonio (Ex. 1006)

Antonio is directed to a method for reducing call dropping in a wireless communication system having multiple beam communication links. Ex. 1006, 1:17–21. Figure 1 of Antonio is reproduced below.

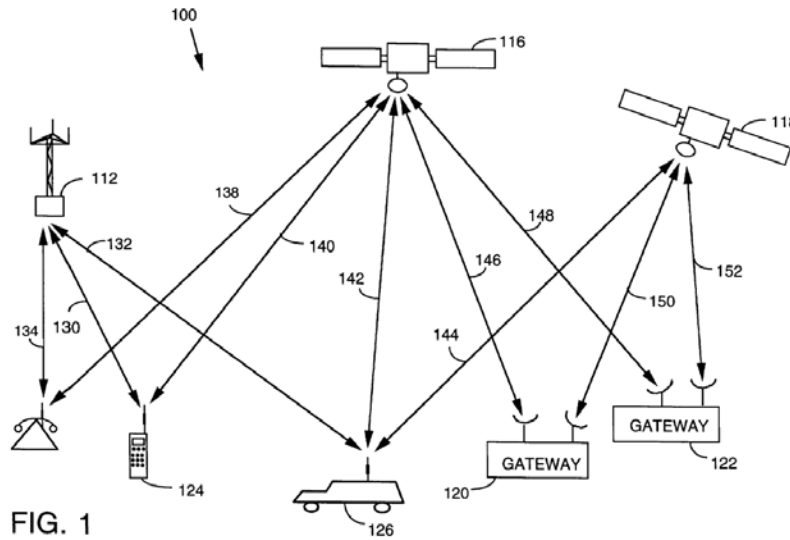


Figure 1 depicts a system 100 having base station 112, satellites 116 and 118, gateways 120 and 122, and user terminals 124, 126, and 128. *Id.* at 6:1–5. Base station 112 projects beams within a cell covering a predetermined service area on the Earth’s surface. *Id.* at 7:25–27. Each of user terminals 124, 126, and 128 is a wireless communication device and also is referred to as a subscriber unit or a mobile station. *Id.* at 6:26–35. As shown in Figure 1, signal paths are used for establishing communications between user terminals 124, 126, and 128 and base station 112 through satellites 116 and 118 with gateways 120 and 122. *Id.* at 6:60–63.

According to Antonio, a beam handoff procedure begins by a gateway transmitting a Beam Mask Message (BMM) containing a list of beam identifiers to a user terminal. *Id.* at 8:55–58. The user terminal measures the beam strength of each beam identified in the most recent BMM. *Id.* at 9:11–13. The user terminal transmits a Pilot Strength Measurement Message (PSMM) to the gateway. *Id.* at 9:57–59. The PSMM contains one or more beam identifiers from the BMM and corresponding beam strength values. *Id.* at 10:16–18.

3. Claim 16

Petitioner contends that independent claim 16 would have been obvious in view of Alastalo and Antonio. Pet. 21, 23–63. Petitioner’s contentions with regard to the asserted combination of references teaching all the limitations of claim 16 and motivation to combine the relevant teachings of the cited references are detailed and well-supported. *Id.* Patent Owner directs all its arguments in the Response to motivation to combine. *See generally* PO Resp. At oral argument, the attorneys for the parties agreed that the only disputes related to motivation to combine. Petitioner’s attorney stated, “[P]atent [O]wner does not dispute that all of the limitations recited in the claim are shown in the prior art. Patent [O]wner only argues only about the combinability of the references.” Tr. 4. Patent Owner’s attorney stated, “the dispute here is essentially regarding issues relating to the motivation to combine.” *Id.* at 13. After consideration of the arguments and evidence submitted by the parties, we determine Petitioner establishes that claim 16 is unpatentable over a combination of the relevant teachings of Alastalo and Antonio. A limitation-by-limitation analysis and analysis of the motivation to combine the relevant teachings of the cited art follows.

“A wireless communication system, comprising”

Petitioner asserts, “*Alastalo* discloses the preamble, to the extent that the preamble is limiting.”⁴ Pet. 34. *Alastalo* provides, “[a] data communication system . . . with means for wireless data communication.” Ex. 1005, at code (57) (Abstract). *Alastalo* teaches a wireless communication system.

“a phased array antenna configured to transmit beam downlinks”

Petitioner contends, “*Alastalo* discloses this element.” Pet. 35 (citing Ex. 1003 (Winters Decl.) ¶ 55). Petitioner relies on Figures 2 and 3 of *Alastalo* and the related description as summarized above in our overview of *Alastalo*. *Id.* at 35–38 (citing Ex. 1003 (Winters Decl.) ¶¶ 55–60). The Petition states, “*Alastalo*’s ‘smart antenna,’ which includes the antenna array arrangement 30, [see Fig. 3, reproduced above] that utilizes phasing to direct transmission beams for each communication nodes teaches, ‘a phased array antenna configured to transmit beam downlinks.’” *Id.* at 37–38 (citing Ex. 1003 (Winters Decl.) ¶ 60). We find *Alastalo* teaches this limitation.

⁴ “[W]here a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention, the preamble is not a claim limitation.” *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997). The preamble of claim 16 is a statement of purpose or intended use and claim 16 otherwise appears to define a structurally complete invention. Thus, our initial determination is that the preamble of claim 1 is not limiting. However, we need not decide whether the preamble of claim 16 is limiting as we determine the Petitioner establishes the cited art teaches a wireless communication system.

“a transceiver operatively coupled to the phased array antenna and configured to send and receive electromagnetic signals via the phased array antenna”

Petitioner relies on Alastalo as teaching this limitation. Pet. 38–39. Alastalo states, “[e]ach of the router nodes 1 to 3 [see Fig. 1] is provided with transceiver means to enable wireless transmission and reception there between.” Ex. 1005 ¶ 23. Alastalo also provides:

At least some of the wireless router nodes 1 to 7 [see Fig. 2, reproduced above] is provided with antenna means that are adapted to direct the transmission to a desired location. Alternatively, or additionally, at least some of the wireless router nodes 1 to 7 is provided with antenna means that are adapted to direct the reception thereof towards a desired location.

Id. ¶ 29.

And, Alastalo states, “[i]t shall be appreciated that the FIG. 2 illustration applies only for a given radio propagation environment.” *Id.* ¶ 27. With regard to this statement, the Petitioner contends, “[a] POSITA would have known that the transmission and reception beams are electromagnetic signals since *Alastalo*’s system is radio-based and the beams are ‘radiated’ in a radio propagation environment.” Pet. 39 (citing Ex. 1003 (Winters Decl.) ¶ 65; Ex. 1010, 1 (“The radio spectrum is the radio frequency (FR) portion of the electromagnetic spectrum.”)).

We find Alastalo teaches this limitation.

“an access point that includes the phased array antenna and the transceiver, the access point configured to”

Petitioner relies on Alastalo as teaching this limitation. Pet. 39–40. Alastalo states that an “access point may be provided in one or all of the

nodes 1 to 3 of FIG. 1, or may be provided in a separate access node, such as a base transceiver station.” Ex. 1005 ¶ 24. Alastalo also states, “[t]he access point may comprise appropriate transceiver and controller means such as those known from the base stations for the cellular communication systems.” *Id.* ¶ 101. Petitioner contends, “[s]ince any of *Alastalo*’s nodes 1 to 3 is an ‘access point,’ and since all those nodes can include a phased array antenna, Alastalo renders obvious that any one of the nodes 1 to 3 is ‘an access point that includes the phased array antenna.’” Pet. 40 (citing Ex. 1003 (Winters Decl.) ¶ 70). We find Alastalo teaches this limitation.

“selectively allow a receiving device to operatively associate with a beam downlink transmitted to the receiving device via the phased array antenna”

Petitioner relies on a combination of Alastalo and Antonio as teaching this limitation. Pet. 41–44.

Alastalo states, “[i]t is also possible that at least one of the transmitting or receiving stations comprises a mobile user terminal. The mobile terminal comprises a mobile station enabled to communicate with another station.” Ex. 1005 ¶ 101. Petitioner contends, “[b]y transmitting data to a mobile user terminal using a downlink beam, Alastalo’s communication node (access point) allows the mobile user terminal to operatively associate with the downlink beam.” Pet. 41 (citing Ex. 1003 (Winters Decl.) ¶ 73). As discussed above, Alastalo teaches, “a phased array antenna configured to transmit beam downlinks.”

Antonio states:

Based on messages sent from the user terminal to the communication station, the communication station can

determine the most desirable beam(s) on which to transmit information or data to the user terminal. The messages sent from the user terminal to the communication station contain values representing beam strengths as measured at the user terminal. The communication station uses these values to select the most desirable beams that should be used as a communication link between the communication station and the user terminal. The beams that should be used are the beams that if used will decrease call dropping rates and provide the desired level of beam source diversity.

Ex. 1006, 3:1–12. Petitioner contends, “*Alastalo’s* network system with communication nodes (e.g., access points) that transmit downlink beams using phased array antennas in combination with *Antonio’s* teaching of selectively associating user terminals with at least the strongest transmission beam renders obvious, *selectively allow a receiving device to operatively associate with a beam downlink transmitted to the receiving device via the phased array antenna.*” Pet. 44 (citing Ex. 1003 (Winters Decl.) ¶ 78). We find the combination of *Alastalo* and *Antonio* teaches this limitation.

“*receive an uplink transmission from the receiving device through the phased array antenna*”

The Petition states, “[t]he combination of *Alastalo* and *Antonio* renders this element obvious.” Pet. 44 (citing Ex. 1003 (Winters Decl.) ¶ 79). As noted above with regard to the “transceiver” limitation, *Alastalo* teaches “a transceiver operatively coupled to the phased array antenna and configured to send and receive signals via the phased array antenna” as recited in claim 16. *Antonio* states, “the user terminal transmits a Pilot Strength Measurement Message (PSMM) to the gateway.” Ex. 1006, 9:58–59.

The Petition further states with regard to this limitation:

A POSITA would have understood that the PSMM transmission from the user terminal to the gateway (e.g., access point) is an “*uplink transmission*.” Ex.1003 [Winters Decl.], ¶82. A POSITA also would have found it obvious that implementing *Antonio*’s teaching in *Alastalo*’s networking system would include the user terminal communicating with *Alastalo*’s communication nodes (e.g., access points) via each node’s phased array antenna.

Pet. 45. We find the combination of *Alastalo* and *Antonio* teaches this limitation.

“determine from the uplink transmission if the receiving device should operatively associate with a different beam downlink transmission”

The Petition states, “[t]he combination of *Alastalo* and *Antonio* renders this element obvious.” Pet. 46 (citing Ex. 1003 (Winters Decl.) ¶ 84). As shown above with regard to the immediately preceding “receive an uplink transmission” limitation, “*Alastalo* in combination with *Antonio* teaches receiving a PSMM in an uplink transmission.” Pet. 46 (citing Ex. 1003 (Winters Decl.) ¶ 85). *Antonio* states:

After receiving a PSMM from the user terminal, the gateway determines a new active beam set (step 512 [see Fig. 5A]). The new active beam set is the set of beams that should be used as communication links between the gateway and the user terminal. . . . In step 804 [see Fig. 8], the gateway selects the strongest beam in the PSMM and adds that beam to the new active beam set. That is the gateway selects the largest beam strength values from the PSMM, determines the beam corresponding to the selected value, and adds that beam to the new active beam set.

Ex. 1006, 10:65–11:14. Antonio also states, “the gateway uses the PSMM to determine which beam(s) should be used for transmitting traffic to the user terminal.” *Id.* at 14:9–11. We find the combination of Alastalo and Antonio teaches this limitation.

“and at least one of: allow the receiving device to operatively associate with the different beam downlink if determined that the receiving device should operatively associate with the different beam downlink; force the receiving device to operatively associate with the different beam downlink if determined that the receiving device should be operatively associated with the different beam downlink”

The Petition states, “[t]he combination of *Alastalo* and *Antonio* renders this element obvious.” Pet. 49 (citing Ex. 1003 (Winters Decl.) ¶ 91). As shown above with regard to the immediately preceding “determine” limitation, “in the combination of *Alastalo* and *Antonio*, the communication node (access point) determines that the user terminal should operatively associate with the strongest beam (*‘different beam downlink’*).” Pet. 49. Antonio states:

[A]s the first step of initiating a soft handoff, the gateway starts transmitting traffic on the beams in the new active beam set that are not in the current active beam set if there are any such beams (step 516 [see Fig. 5A]). In the next step, the gateway sends a handoff direction message (HDM) to the user terminal (step 518). In one embodiment, the HDM can contain two sets of beam identifiers, and [sic] add beam set and a drop beam set . . . In a second embodiment, the HDM contains a beam identifier corresponding to each beam in the new active beam set. . . .

In either the first or second embodiments, the user terminal, upon receiving an HDM, begins to receive traffic over the beams identified in the add beam set (step 520 [see Fig. 5B]). Once the user terminal begins receiving information on the

beams in the add beam set, the user terminal will stop receiving information on the beams identified in the drop beam set (step 522). The user terminal then transmits a handoff completion message (HCM) to the gateway (step 524). Upon receiving the HCM from the user terminal, the gateway stops transmitting traffic on the beams identified in the drop beam set (step 526). In this manner, soft beam handoff is accomplished.

Ex. 1006, 13:8–41. Petitioner contends that Antonio teaches both allowing the receiving device and forcing the receiving device to operatively associate with a different downlink beam. Pet. 49 (“Here, the prior art teaches both.”)

With regard to the “allow” portion of this limitation, the Petition states:

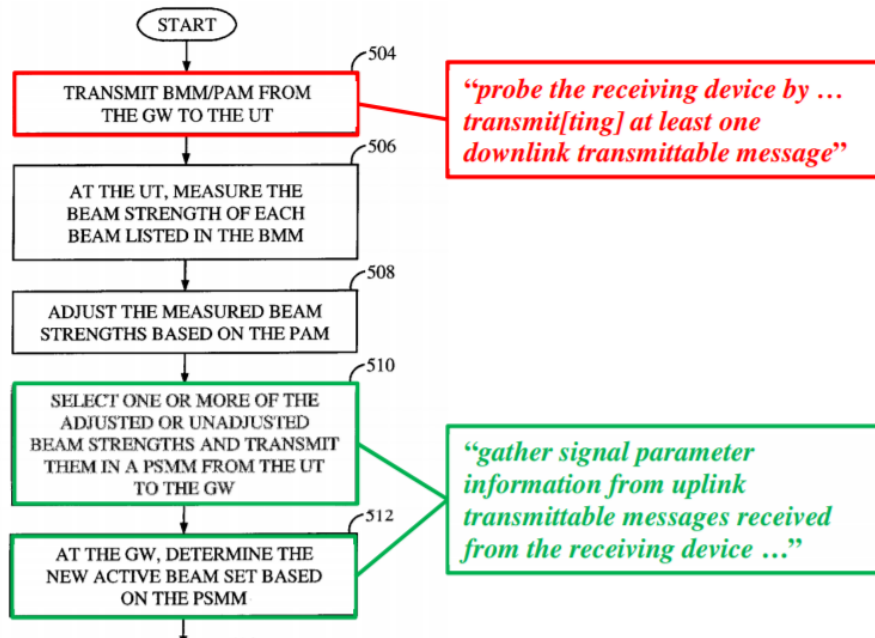
[B]y the gateway sending the HDM—which identifies the strongest beam (“*different beam downlink*”) for the user terminal to utilize for communication links—the gateway “*allows*” the user terminal to utilize a different beam for downlink transmission. *Antonio* therefore teaches that the communication node **allows** the user terminal to operatively associate with the different beam downlink based on a determination made by the communication node.

Pet. 50–51 (citing Ex. 1003 (Winters Decl.) ¶ 94). With regard to the “force” portion of this limitation, the Petition states, “[o]ne way is that *Antonio*’s ‘soft’ handoff procedure can produce an ‘add beam set’ (i.e., that identifies the new active beams) that is entirely made up of beams not in the current beam set.” *Id.* at 51 (citing Ex. 1003 (Winters Decl.) ¶ 98). We find the combination of Alastalo and Antonio teaches this limitation.

“wherein the access point is further configured to actively probe the receiving device by generating a signal to initiate that the phased array antenna transmit at least one downlink transmittable message over the beam downlinks, and gather signal parameter information from uplink

transmittable messages received from the receiving device through the phased array antenna”

Petitioner relies on the combination of Alastalo and Antonio with regard to this limitation. Pet. 53–62. As discussed above in connection with the “phased array antenna” and “transceiver” limitations, “*Alastalo* teaches a plurality of communication nodes (e.g., access points) that include a transceiver, where the transceiver uses a phased-array antenna to transmit and receive data via transmission and reception beams (i.e., uplink and downlink transmission beams, respectively).” *Id.* at 53–54 (citing Ex. 1003 ¶ 105). The Petition (Pet. 58) contains an annotated, partial Figure 5A from Antonio, reproduced below.



The annotated, partial Figure 5A depicts how Petitioner contends steps 504, 510, and 512 relate to this limitation. With regard to the access point actively probing the receiving device, Antonio states:

The beam hand off procedure begins at step 504. In step 504, the gateway transmits a Beam Mask Message (BMM) to the user terminal over the established link(s). . . .

The gateway performs step 504 periodically. For example, the gateway may send an updated BMM every minute.

...

The user terminal measures the beam strength of each beam identified in the most recent BMM received from the gateway (step 506).

Ex. 1006, 8:55–58, 66–67, 9:11–13. Based on these teachings, Petitioner contends:

Since *Alastalo*’s network includes communication nodes (e.g., access points) that transmit downlink beams to mobile terminals via phased array antennas, it would have been obvious to a POSITA that implementing *Antonio*’s teachings of transmitting a Beam Mask Message to a user terminal in *Alastalo*’s network would result in the Beam Mask Message being transmitted to the user terminal via the communications node’s phased array antenna.

Pet. 56 (citing Ex. 1003 (Winters Decl.) ¶ 110). With regard to the “gather signal parameter information” portion of this limitation, Antonio states, “[a]fter step 508, the process progresses to step 510, where the user terminal transmits a Pilot Strength Measurement Message (PSMM) to the gateway” and “[t]he PSMM transmitted from the user terminal to the gateway contains one or more beam identifiers from the BMM 600 and corresponding beam strength values.” Ex. 1006, 9:57–59, 10:16–18. Based on these teachings, Petitioner contends, “[b]ecause the PSMMs are received by the gateway from the user terminal, a POSITA would have recognized that the PSMMs are ‘*uplink transmittable messages*.’ A POSITA would also have recognized that the ‘corresponding beam strength values’ included in the PSMMs are ‘*signal parameter information*’ about the transmission beams.” Pet. 58 (citing Ex. 1003 (Winters Decl.) ¶ 118). We find the combination of

Alastalo and *Antonio* teaches all elements of the “wherein” limitation of claim 16.

Motivation to Combine the Cited Art

Petitioner contends, “[a] POSITA would have been motivated to combine the teachings of *Alastalo* and *Antonio* to produce the obvious, beneficial, and predictable result of providing alternative communication beams and reducing call dropping rates in *Alastalo*’s wireless communication system.” Pet. 29 (citing Ex. 1003 (Winters Decl.) ¶ 43). The Petition states:

A POSITA would have found it obvious to utilize *Antonio*’s method (of selecting multiple transmission beams that the user terminal should associate with) in *Alastalo*’s communication system that uses communication nodes with phased array antennas to transmit and receive data via transmission beams. Ex.1003, ¶77. Such a combination would have been nothing more than using *Antonio*’s known technique of selecting multiple beams, including the strongest beam, from among a plurality of beams, to maintain a communication link between a communication station and a user terminal with *Alastalo*’s network that uses phased array antennas to direct transmission and reception beams between communication nodes and mobile terminals. Ex.1003, ¶77. Such a combination would yield the predictable and beneficial results of mitigating signal dropping experienced by the mobile terminal in *Alastalo*’s communication system. Ex.1003, ¶77; *see also* Reasons to Combine, *supra* §X.D.3 [Pet. 29–33].

In fact, *Antonio* was specifically designed as an improvement for terrestrial networks such as those described in *Alastalo* that use directed beam transmissions for communication between nodes. Ex.1003, ¶77; *see* Ex.1006, 5:40-62. In the combination of *Alastalo* and *Antonio*, a POSITA would have recognized that the user terminal would communicate with the network’s communication node via the transmit and receive

beams provided via the node's (access point's) phased-array antenna. Ex.1003, ¶77.

Pet. 43. We agree with Petitioner that one of ordinary skill would have been motivated to combine the teachings of Alastalo and Antonio in order to provide alternative communication beams and to reduce call dropping rates. We find the Petition contains a reasonable and well-supported rationale and explanation showing the existence of a motivation to combine the relevant teachings of Alastalo and Antonio.

As noted previously, Patent Owner directs all its arguments in the Response to motivation to combine. *See generally* PO Resp. Patent Owner argues that the deposition testimony of Petitioner's technical witness, Dr. Winters, establishes that "Dr. Winters did not offer opinions sufficient to show a motivation to combine. To the contrary, Dr. Winters testified . . . he merely concluded that the ordinary artisan would have '**considered** the technologies that were available,' and as part of the process 'would look at the **possibility** of combining Antonio and Alastalo.'" PO Resp. 1 (citing Ex. 2003 (Winters Deposition Transcript) 41:17–23). We find that the deposition testimony of Dr. Winters confirms rather than contradicts Dr. Winters's declaration. In his declaration, Dr. Winters stated, "[a] POSITA would have been motivated to combine the teachings of Alastalo and Antonio to produce the obvious, beneficial, and predictable result of providing alternative communication beams and reducing call dropping rates in Alastalo's wireless communication system." Ex. 1003 ¶ 43. These conclusions are well-supported with explanations and reasoning that are based on the teachings of Alastalo and Antonio. *Id.* ¶¶ 44–51. The testimony that Patent Owner cites is:

Q. So you're saying that a person of skill in the art would look at the possibility of combining Antonio and Alastalo.

A. Yes. A person -- a POSITA would at that time have considered the technologies that were available.

Ex. 2003, 41:17–23. We do not discern how agreeing “that a person of skill in the art would look at the possibility of combining Antonio and Alastalo” and stating that “a POSITA would at the time have considered the technologies that were available” contradicts Dr. Winters’s testimony that a motivation to combine the teachings of Alastalo and Antonio existed. To the contrary, this testimony confirms and supports Dr. Winters’s statements in his declaration relating to motivation to combine the relevant teachings of these references. We have reviewed Dr. Winter’s declaration and his deposition transcript and find that are consistent and fully support Petitioner’s arguments relating to motivation to combine the relevant teachings of Alastalo and Antonio.

Patent Owner also argues “the Petition fails to explain how a POSA could combine Alastalo with Antonio to implement the Petition’s proposed modifications.” PO Resp. 2. To the contrary, as discussed above, the Petition contains well-supported reasoning on how and why one of ordinary skill in the art would combine the relevant teachings of the cited references. *See* Pet. 29–34.

Petitioner establishes, and Patent Owner does not contest, that Alastalo and Antonio teach all the limitations of claim 16. Petitioner provides well-supported rationale for combining the relevant teachings of Alastalo and Antonio. We also are persuaded that Petitioner shows a person having ordinary skill in the art would have had a reasonable expectation of success and Patent Owner’s arguments and evidence do not undermine

Petitioner's showing. Weighing all the evidence and arguments presented by the parties, we conclude that a preponderance of the evidence establishes that claim 16 is unpatentable based on Alastalo and Antonio.

E. Asserted Obviousness of Claim 16 Based on Alastalo, Antonio, and the WTEC Report

Petitioner challenges claim 16 as obvious in view of Alastalo, Antonio, and the WTEC Report. Pet. 21, 62–70. In its Response, Patent Owner never makes reference to the WTEC Report. *See generally* PO Resp. And, the Patent Owner fails to specifically address this challenge to claim 16 or this combination of references. *Id.* Based on this record and for the reasons stated herein, we conclude claim 16 would have been obvious over Alastalo, Antonio, and the WTEC Report.

1. WTEC Report (Ex. 1012)

The WTEC Report is directed to “smart antenna technology, including software and system aspects.” Ex. 1012, 53. Figure 6.1 of the WTEC report is reproduced below.

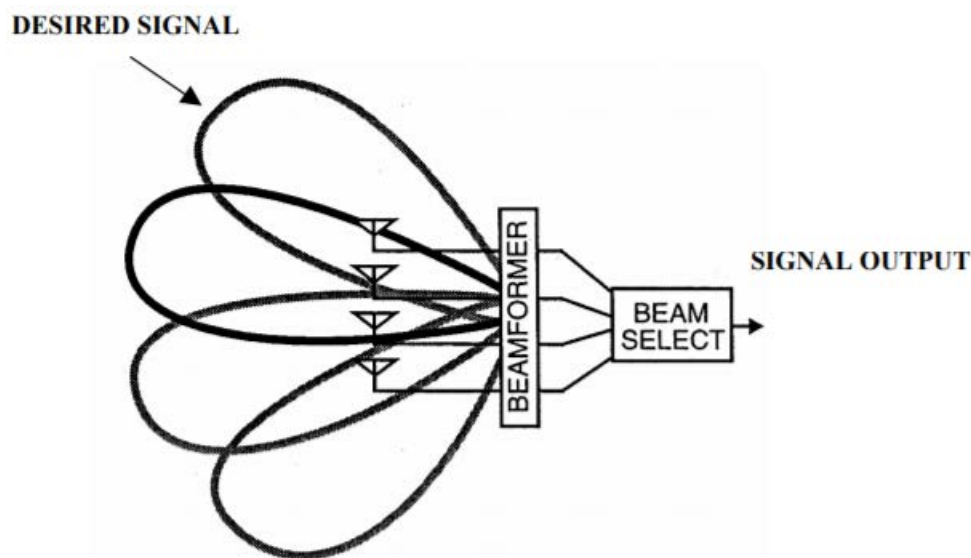


Fig. 6.1. Phased array.

Figure 6.1 depicts “the phased array or multibeam antenna, which consists of either a number of fixed beams with one beam turned on towards the desired signal or a single beam (formed by phase adjustment only) that is steered toward the desired signal.” *Id.* The WTEC Report states, “[p]hased arrays are mainly being studied for point-to-point wireless systems, e.g., for wireless local loops. They are also being considered for macrocellular base stations.” *Id.* at 55.

2. Claim 16

Petitioner’s presentation with regard to the unpatentability of claim 16 based on the combination of Alastalo, Antonio, and the WTEC Report is detailed and well-supported. *See* Pet. 62–70. As shown below, Petitioner relies on the WTEC Report for its teaching of implementing a smart antenna as taught in Alastalo as a phased array antenna as taught in the WTEC Report. Otherwise, Petitioner’s showing as to the combination of Alastalo, Antonio, and the WTEC Report relies on its showing as to the combination of Alastalo and Antonio as analyzed above. We have reviewed Petitioner’s contentions and evidence and determine that Petitioner as shown that the combination of Alastalo, Antonio, and the WTEC Report teaches all the limitations of claim 16. Petitioner has also articulated reasonable and supported rationale for combining the relevant teachings of the cited art. Accordingly, we conclude claim 16 is unpatentable based on the combination of Alastalo, Antonio, and the WTEC Report.

“A wireless communication system, comprising”

With regard to the preamble, the Petition states, “*Alastalo* discloses the preamble, as discussed above.” Pet. 66.

“a phased array antenna configured to transmit beam downlinks”

With regard to this limitation, the Petition states, “[a]s discussed above . . . , *Alastalo* describes, ‘a so called smart antenna arrangement’ that is configured to transmit ‘directed channel beams (DCHB).’” Pet. 67 (citing Ex. 1005 ¶¶ 26, 30). In addition, the WTEC Report teaches use of a phased array antenna as a smart antenna for a wireless system. Ex. 1012, 53. The Petitioner contends, “*Alastalo*’s smart antenna that transmits directed data channel beams, in combination with the *WTEC Report*’s phased array antenna, renders obvious ‘a phased array antenna configured to transmit beam downlinks.’” Pet. 67 (citing Ex. 1003 (Winters Decl.) ¶ 141).

“a transceiver operatively coupled to the phased array antenna and configured to send and receive electromagnetic signals via the phased array antenna”

With regard to this limitation, the Petition states, “*Alastalo* discloses [this] limitation . . . as discussed above” and “it would have been obvious to a POSITA to employ a phased array antenna, as described in *WTEC Report*, in place of the smart antenna described in *Alastalo*.” Pet. 68.

“an access point that includes the phased array antenna and the transceiver, the access point configured to”

With regard to this limitation, the Petition states, “*Alastalo* renders obvious this element, as discussed above” and “it would have been obvious to a POSITA to employ a phased array antenna, as described in *WTEC Report*, in place of the smart antenna described in *Alastalo*.” Pet. 68.

“selectively allow a receiving device to operatively associate with a beam downlink transmitted to the receiving device via the phased array antenna”

With regard to this limitation, the Petition states, “[t]he combination of *Alastalo* and *Antonio* renders this element obvious, as discussed above” and “it would have been obvious to a POSITA to employ a phased array antenna, as described in *WTEC Report*, in place of the smart antenna described in *Alastalo*.” Pet. 68.

“receive an uplink transmission from the receiving device through the phased array antenna”

With regard to this limitation, the Petition states, “[t]he combination of *Alastalo* and *Antonio* renders this element obvious, as discussed above” and “it would have been obvious to a POSITA to employ a phased array antenna, as described in the *WTEC Report*, in place of the smart antenna described in *Alastalo*.” Pet. 68–69.

“determine from the uplink transmission if the receiving device should operatively associate with a different beam downlink transmission”

With regard to this limitation, the Petition states, “[t]he combination of *Alastalo* and *Antonio* renders this element obvious, as discussed above.” Pet. 69 (citing Ex. 1003 (Winters Decl.) ¶ 146).

“and at least one of: allow the receiving device to operatively associate with the different beam downlink if determined that the receiving device should operatively associate with the different beam downlink; force the receiving device to operatively associate with the different beam

downlink if determined that the receiving device should be operatively associated with the different beam downlink”

With regard to this limitation, the Petition states, “[t]he combination of *Alastalo* and *Antonio* renders this element obvious, as discussed above.” Pet. 69 (citing Ex. 1003 (Winters Decl.) ¶ 147).

“wherein the access point is further configured to actively probe the receiving device by generating a signal to initiate that the phased array antenna transmit at least one downlink transmittable message over the beam downlinks, and gather signal parameter information from uplink transmittable messages received from the receiving device through the phased array antenna”

With regard to this limitation, the Petition states, “[t]he combination of *Alastalo* and *Antonio* renders the [elements of this limitation] obvious, as discussed above” and “it would have been obvious to a POSITA to employ a phased array antenna, as described in *WTEC Report*, in place of the smart antenna described in *Alastalo*.” Pet. 69–70.

Motivation to Combine the Cited Art

Petitioner contends, “[a] POSITA would have found it obvious to combine the teachings of *Alastalo* and the *WTEC Report* because *Alastalo* describes a system employing ‘smart antennas,’ and the *WTEC Report* provides further details about the operation and capabilities of such devices.” Pet. 62 (citing Ex. 1003 (Winters Decl.) ¶ 128). The Petition states:

In particular, *Alastalo* explains that smart antennas already existed in the prior art, as *Alastalo* states that “‘smart antenna’ is commonly use[d] to refer to an antenna arrangement providing digital beam forming.” Ex.1005, [0010]. Since smart antennas

were already known, *Alastalo* appropriately does not describe them in detail. *In re Buchner*, 929 F.2d 660, 661 (Fed. Cir. 1991) (“The specification need not disclose what is well known in the art.”). Thus, a POSITA considering or implementing the techniques of *Alastalo* would have likely been familiar with smart antennas. Ex.1003, ¶130. A POSITA seeking further details on the well-known smart antennas referenced in *Alastalo* would have found obvious to consult a reference, such as the *WTEC Report* chapter entitled “Smart Antennas” for such additional detailed information. Ex.1003, ¶130. Alternatively, a POSITA—who would have had at least two years of experience with wireless systems employing beamforming technologies—would have already known much or all of the additional information described in the *WTEC Report*. Ex.1003, ¶130. Under that view, the *WTEC Report* simply evinces the background knowledge of a POSITA.

Id. at 63. The Petition includes additional argument and evidence supporting the motivation to combine the relevant teachings of the cited references. *See id.* at 63–66. We find Petitioner has provided well-supported rationale and explanation as to the motivation to combine the relevant teachings of *Alastalo*, Antonio and the *WTEC Report*.

We conclude claim 16 of the ’728 patent would have been obvious over *Alastalo*, Antonio, and the *WTEC Report*.

F. Patent Owner’s Contingent Motion to Amend

Patent Owner moves that “[i]n the event that the Board finds original claim 16 unpatentable, [Patent Owner] respectfully requests that the Board grant this motion to amend with respect to the corresponding proposed substitute claim 18.” Mot. to Amd. 1. As we find original claim 16 unpatentable, we address Patent Owner’s Motion to Amend. For the reasons that follow, the Motion to Amend is denied.

In reviewing a motion to amend, we consider whether the motion meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 (PTAB Feb. 25, 2019) (precedential). The patent owner must demonstrate the following: (1) the amendment responds to a ground of unpatentability involved in the trial; (2) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter; (3) the amendment proposes a reasonable number of substitute claims; and (4) the proposed claims are supported in the original disclosure of the patent.⁵ See 35 U.S.C. § 316(d); 37 C.F.R. § 42.121; see also *Lectrosonics, Inc.*, slip op. at 4–8. With regard to these requirements, the dispute between the parties relates only to whether substitute claim 18 is supported by the disclosure of the ’728 patent. See generally MTA Opp. and MTA Reply.

We also consider unpatentability. In that regard, the patent owner “does not bear the burden of persuasion to demonstrate the patentability of [the proposed] substitute claims.” *Lectrosonics, Inc.*, slip op. at 4 (citing

⁵ Petitioner correctly argues that Patent Owner does not cite to the originally filed application “but rather only cites to the specification of the issued ’728 patent.” MTA Opp. 2. In response, Patent Owner states, “[t]he [’728] patent’s specification is identical to the original application, and was not amended in any way during prosecution. In other words, the specification here is the original disclosure of the patent.” MTA Reply 2. Petitioner identifies no differences between the original application as filed and the Specification of the issued ’728 patent but argues we must still deny the motion on this basis as the Motion to Amend is procedurally deficient. MTA Sur-Reply 1–2. We agree with Petitioner that Patent Owner should have cited to the original disclosure of the patent, but we do not reach this issue as we believe it is better to decide the Motion to Amend on the merits rather than a procedural issue.

Aqua Prods., Inc. v. Matal, 872 F.3d 1290 (Fed. Cir. 2017); *Bosch Auto. Serv. Sols. LLC v. Iancu*, 878 F.3d 1027 (Fed. Cir. 2017)). “Rather, as a result of the current state of the law and [U.S. Patent and Trademark Office] rules and guidance, the burden of persuasion ordinarily will lie with the petitioner to show that any proposed substitute claims are unpatentable by a preponderance of the evidence.” *Lectrosonics, Inc.*, slip op. at 4.

For the reasons explained below, we conclude that proposed substitute claim 18 does not have written description support in the Specification of the ’728 patent. We also conclude proposed substitute claim 18 is obvious.

1. Proposed Substitute Claim 18

Proposed substitute claim 18 is set forth below with additions to claim 16 underlined and the deletion shown in strikethrough:

18. (Substitute for claim 16, if found unpatentable) A wireless communication system compliant with IEEE 802.11 standards, comprising:

a phased array antenna configured to transmit beam downlinks;

a transceiver operatively coupled to the phased array antenna and configured to send and receive electromagnetic signals via the phased array antenna; and

an access point compliant with IEEE 802.11 standards that includes the phased array antenna and the transceiver, the access point configured to:

selectively allow a receiving device to operatively associate with a beam downlink transmitted to the receiving device via the phased array antenna;

transmit a plurality of downlink transmittable messages to a receiving device compliant with IEEE 802.11 standards through the phased array antenna;

receive ~~an~~ plurality of uplink transmissions sent from the receiving device in response to the plurality of downlink transmittable messages through the phased array antenna;

determine from at least one of the plurality of uplink transmissions if the receiving device should operatively associate with a different beam downlink transmission, wherein the determination is based at least in part on an angular parameter;

and at least one of: allow the receiving device to operatively associate with the different beam downlink if determined that the receiving device should operatively associate with the different beam downlink; force the receiving device to operatively associate with the different beam downlink if determined that the receiving device should be operatively associated with the different beam downlink;

wherein the access point is further configured to actively probe the receiving device by generating a signal to initiate that the phased array antenna transmit at least one downlink transmittable message over the beam downlinks, and gather signal parameter information from uplink transmittable messages received from the receiving device through the phased array antenna;

wherein each of the plurality of downlink transmittable messages includes a null data frame.

Mot. to Amd. i–ii (Claims App.).

2. Written Description

A motion to amend must set forth “support in the original disclosure of the patent for each claim that is added or amended.” 37 C.F.R.

§ 42.121(b)(1). The test for determining compliance with the written description requirement is whether the disclosure of the application as

originally filed reasonably conveys to a person of ordinary skill in the art that the inventor had possession at that time of filing of the claimed subject matter, rather than the presence or absence of literal support in the specification for the claim language. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991); *In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983).

We determine that there is no written description support for the proposed amendment “an access point ***compliant with IEEE 802.11 standards***.” In the Motion to Amend, Patent Owner cites column 4, lines 38 through 44, of the ’728 patent in support of this amendment. See Mot. to Amd. 7;⁶ see also MTA Reply 6–7 (citing same passage). The cited passage in the ’728 patent states: “the examples presented herein are directed towards wireless IEE[E] 802.11 type network configurations, wherein the ***client device*** is capable of roaming within the coverage area of the smart antenna and the ***client device*** is configured to establish an association with an access point over a main beam.” Ex. 1001, 4:38–44 (emphasis added). This passage relates to the capability and configuration of the client device

⁶ In this section of the Motion to Amend, Patent Owner does not even clearly assert that the Specification of the ’728 patent provides written description for this amendment. See Mot. to Amd. 7 (“[T]he access point ***may be*** compliant with 802.11 standards.”) (emphasis added). The declaration of Patent Owner’s technical witness, Dr. Short, filed in support of the motion to amend provides nothing more than a verbatim recitation of this sentence and a citation to same passage in the ’728 patent with no reasoning or explanation. See Ex. 2006, ¶ 36. As the cited passage does not support his statement, we give no weight to this portion of Dr. Short’s declaration. See 37 C.F.R. § 42.65(a). And, we find that Patent Owner’s ambiguous assertion lacks evidentiary support.

not the access point. *See* Ex. 2006 (Short Decl.), ¶ 40 (citing this same passage in support of the statement that “a POSA would understand that the **receiving device** can be 802.11 **compatible**.”)⁷ (emphasis added). We agree with Petitioner and its technical declarant, Dr. Winters, that Patent Owner “does not identify any written description support for ‘an access point compliant with IEEE 802.11 standards,’ as recited in Substitute Claim 18.” MTA Opp. 8 (citing Ex. 1025 (Winters Decl.) ¶ 43).

Although not cited or relied upon by Patent Owner, there are other passages in the Specification of the ’728 patent that mention IEEE 802.11. The “Background” section of the ’728 patent states, “[c]urrently, a very popular form of wireless communication includes the IEEE 802.11 family of protocols/standards.” Ex. 1001, 2:10–12. We do not find any written description support for making “an access point compliant with IEEE 802.11 standards” in this passage or elsewhere in the “Background.”⁸

The ’728 patent also states, “[i]n certain implementations, for example communication logic 118 would therefore be configured to perform an association process that establishes a communication link under IEEE 802.11(a), IEEE 802.11(b), IEEE 802.11(g), etc.” *Id.* at 6:3–7. As shown in Figure 1 (reproduced above) and stated previously in this paragraph of the Specification, communication logic 118 is in the client device not the access point. *See id.* at 5:66–67 (“client device 104 includes communication logic

⁷ Petitioner argues that a “compatible” device is not necessarily “compliant.” MTA Opp. 7 (citing Ex. 1025 (Winters Decl.) ¶ 41 (“a device may be **compatible** but **not compliant** with IEEE 802.11 standards”). We agree.

⁸ The “Background” concludes by stating, “there is a need for methods and apparatuses that will effectively cause a **receiving device** to switch beam association within a smart antenna based wireless communication system at selected times.” Ex. 1001, 2:47–50 (emphasis added).

118”). We do not find any written description support for “an access point compliant with IEEE 802.11 standards” in this passage.

The ’728 patent further states:

One of the benefits to method 200 is that conventional IEEE 802.11 family **compliant client devices** need not be changed or altered to work with the methods and apparatuses described herein. Thus, for these types of systems, only access point 102 and possibly access point 108 need to be altered or modified.

Id. at 8:22–27 (emphasis added). This is the only passage in the ’728 patent that references IEEE 802.11 and uses the term “compliant.” However, it refers only to “IEEE 802.11 family compliant **client devices**,” not access points. *Id.* In addition, this passage states that “IEEE 802.11 family compliant client devices need not be changed or altered to work with the methods and apparatuses described herein.” *Id.* at 8:23–25. With regard to access points, it states, “for these types of systems, only access point 102 and possibly access point 108 need to be altered or modified.” *Id.* at 8:25–27. Taken together, these passages provide that IEEE 802.11 compliant client devices need not be changed or modified to work with the methods and devices described in the ’728 patent but that for these type of systems, i.e., IEEE 802.11 family compliant systems, access devices need to be, or possibly need to be, altered or modified. Petitioner’s technical witness, Dr. Winters, stated, “[t]his disclosure only refers to client devices compliant with 802.11 standards—not access points.” Ex. 1025, ¶ 42. Patent Owner’s technical witness, Dr. Short, testified that it “contemplat[es] making changes to the 802.11 system so that they could lose some compliance at the access point.” Ex. 1029, 141:22–24. Thus, we do not find any written description

support for “an access point compliant with IEEE 802.11 standards” in this passage.

We conclude that, at least with regard to the proposed “an access point compliant with IEEE 802.11 standard,” the Specification of the ’728 patent does not provide written description support. As there must be written description support for all the proposed claim changes, we deny the Motion to Amend for this reason.

3. *Obviousness*

Petitioner argues that “Substitute Claim 18 is obvious over Alastalo, Antonio, the IEEE 802.11 Handbook [Ex. 1022], and Schiff [US 6,233,456 B1; Ex. 1021].” MTA Opp. 13 (citing Ex. 1025 (Winters Decl.) ¶ 53).

a. The IEEE 802.11 Handbook (Ex. 1022)

The IEEE 802.11 Handbook was published in December, 1999. Ex. 1022, 3. Patent Owner does not argue that the IEEE 802.11 Handbook is not prior art. See MTA Reply 11–12. We find that the IEEE 802.11 Handbook is prior art to the ’728 patent.

The IEEE 802.11 Handbook describes the IEEE 802.11 standard as the “International Standard for WLANs [Wireless Local Area Networks].” Ex. 1022, 5. “The goals of the IEEE 802.11 standard is [sic] to describe a WLAN that delivers services previously found only in wired networks, e.g., high throughput, highly reliable data delivery, and continuous network connections.” *Id.*

The IEEE 802.11 Handbook states:

There are two major components of the WLAN described by IEEE 802.11, the mobile station and the access point (AP). Going well beyond what other IEEE 802 standards have done in the past, IEEE 802.11 defines a complete management protocol between the mobile station and AP. This management protocol

makes it possible for a single IEEE 802.11 WLAN to comprise equipment from many vendors, marking true multivendor interoperability.

Id. at 4.

We also note that the '728 patent describes “the IEEE 802.11 family of protocol/standards” as “very popular” (Ex. 1001, 2:10–12); “an association process that establishes a communication link under IEEE 802.11(a), IEEE 802.11(b), IEEE 802.11(g), etc.” as “well known” (*id.* at 6:4–6, 23); and “IEEE 802.11 family compliant client devices” as “conventional” (*id.* at 8:23–24). Thus, IEEE 802.11 standards, protocols, and client devices are acknowledged to be prior art in the '728 patent.

b. Schiff (Ex. 1021)

Schiff issued on May 15, 2001. Ex. 1021, at code (45). Patent Owner does not challenge the prior art status of Schiff. See MTA Reply 12–13. Schiff is prior art to the '728 patent.

Schiff “relates to performing signal handoff in communication systems, such as wireless data or telephone systems, using satellites.” Ex. 1021, 1:6–8. Schiff states, “pilot or paging signals associated with the service areas form the signals used for detecting service area transitions, and the strength of such signals determines a signal strength for each service area relative to the user terminal position.” *Id.* at 5:6–10. “The pilot or paging signals are received using at least one user terminal receiver, and their strength is measured using known techniques and processing elements.” *Id.* at 5:10–13. The signal strength measurement information is transmitted to a central station. *Id.* at 5:18–20. “The central station then compares received signal strength values and determines relative signal strength.” *Id.* at 5:22–23.

c. Analysis

With regard to substitute claim 18, both parties rely on their respective presentations with regard to claim 16 especially as relating to the limitations present in original claim 16. *See* MTA Opp. 13 (“The following obviousness analysis augments analysis in the Petition.”); MTA Reply 11–12 (non-obviousness arguments limited to only 2 limitations added to claim 18). Accordingly, the dispute between the parties relating to the obviousness of proposed substitute claim 18 relates to limitations sought to be added through the Motion to Amend. As the arguments and evidence presented by the parties with regard to claim 18 are largely limited to the new limitations in claim 18, our analysis provided below is similarly focused although our obviousness conclusion is based on consideration of the claim as a whole.

The Petitioner’s arguments relating to the obviousness of claim 18 is detailed and well-supported. *See* MTA Opp. 13–24. Petitioner establishes that each of the limitations recited in claim 18 are taught by the cited art. *Id.*

“compliant with IEEE 802.11 standards”

Petitioner argues that “Alastalo, Antonio, and the IEEE 802.11 Handbook render obvious a ‘wireless communication system,’ an ‘access point,’ and a ‘receiving device’ that are ‘compliant with IEEE 802.11 standards,’ as recited in Substitute Claim 18.” MTA Opp. 13 (citing Ex. 1025 (Winters Decl.) ¶ 25). As discussed above, Alastalo and Antonio teach a wireless communication system with an access point and a receiving device that include all the limitations of claim 16 and Patent Owner does not contend otherwise. Alastalo states, “[a]n exemplifying wireless system is the so called wireless local area network (WLAN).” Ex. 1005 ¶ 3.

According to the IEEE 802.11 Handbook, IEEE 802.11 is the standard for WLANs. Ex. 1022, 5. The IEEE 802.11 Handbook states that the two major components of the WLAN described by IEEE 802.11 are the access point and mobile station. *Id.* at 4.

Dr. Short, Patent Owner’s technical witness, testified that, by 2000, “[t]here were some very attractive things that 802.11 brought to the table” and that the industry was adopting the IEEE 802.11 standard. Ex. 1028, 71:24–72:22. And, as noted previously, the ’728 uses the terms “very popular,” “well known” and “conventional” in describing the IEEE 802.11 standards, protocols, and devices. Ex. 1001, 2:10–12, 6:4–6, 6:23, 8:23–24. Patent Owner fails to clearly or adequately explain how “compliant with 802.11 standards” distinguishes the invention claimed from the cited art. *See* MTA Reply 11–12.

With regard to the motivation to combine the relevant teachings of the IEEE 802.11 Handbook with those of Alastalo and Antonio, Petitioner states:

Given that the industry was moving toward IEEE 802.11 standards-compliant WLAN wireless communication systems and that such systems provided numerous recognized benefits (discussed above), a POSITA would have been motivated to implement the WLAN wireless communication system of Alastalo as an 802.11 standard compliant system, including compliant access point and compliant mobile terminals. Ex. 1025, ¶ 59. Therefore, it would have been obvious to a POSITA to implement Alastalo’s WLAN wireless communication system (including the base station and mobile terminals) to be compliant with IEEE 802.11 standards, as the IEEE 802.11 Handbook teaches, since the industry was moving in that direction and because doing so would provide the beneficial results of high throughput, high data reliability, power savings, and allow for interoperability. Ex. 1025, ¶ 59. Each of the above distinct

reasons separately and together would have motivated a POSITA to make the proposed combination. *Id.*

MTA Opp. 15–16. We agree with Petitioner. We find that the cited art teaches “[a] wireless communication system compliant with IEEE 802.11 standards,” “an access point compliant with IEEE 802.11 standards,” “a receiving device compliant with IEEE 802.11 standards” as recited in claim 18 and that a motivation to combine the relevant teachings of Alastalo, Antonio, and the IEEE 802.11 Handbook with a reasonable expectation of success existed.

“transmit a plurality of downlink transmittable messages to a receiving device compliant with IEEE 802.11 standards through the phased array antenna”

Petitioner contends “Alastalo, Antonio, and the IEEE 802.11 Handbook render obvious that the access point is configured to ‘transmit a plurality of downlink transmittable messages to a receiving device compliant with IEEE 802.11 standards through the phased array antenna,’ as recited in Substitute Claim 18.” MTA Opp. 16–17 (citing Ex. 1025 (Winters Decl.) ¶ 61). Petitioner argues, “as discussed above, Alastalo in view of the IEEE 802.11 Handbook teaches that the mobile terminals are compliant with IEEE 802.11 standards (‘receiving device compliant with IEEE 802.11 standards.’).” *Id.* at 17 (citing Ex. 1025 (Winters Decl.) ¶ 62). As indicated above, we agree.

In further regard to this limitation, the Petitioner states:

[A]s discussed in the Petition, Alastalo and Antonio in combination teach that the access point is configured to actively probe the mobile terminal by transmitting “a Beam Mask Message (BMM)” ***periodically*** through the phased array

antenna. Pet. 53-55; Ex. 1006, 8:56-67, Fig. 5A. Antonio further teaches that “[t]he user terminal measures the beam strength of each beam identified in the most recent BMM received from the gateway... by measuring the amount of energy in a pilot signal associated with the beam.” Ex. 1006, 9:12-29. The access point periodically transmitting BMM with associated pilots to the receiving mobile terminal teaches that the access point “transmit[s] a plurality of downlink transmittable messages to the receiving device,” as claimed. Ex. 1025, ¶ 63.

MTA Opp. 17. Patent Owner does not argue this limitation. See MTA Reply 11–12. Based on the arguments and evidence presented, we find the cited art teaches this limitation.

“receive a plurality of uplink transmissions sent from the receiving device in response to the plurality of downlink transmittable messages through the phased array antenna”

Petitioner contends that Alastalo, Antonio, and the IEEE 802.11 Handbook render this limitation as recited in the context of claim 18 obvious. MTA Opp. 18. Petitioner argues that “as discussed in the Petition, Alastalo in combination with Antonio teaches that the access point receives a PSMM [Pilot Strength Measurement Message] in an uplink transmission from the mobile terminal through the phased array antenna.” MTA Opp. 18 (citing Pet. 44–45; Ex. 1025 (Winters Decl.) ¶ 67). Petitioner further argues:

[A]s already noted, Antonio sends a BMM [Beam Mask Message] **periodically**, for example, the “gateway may send an updated BMM every minute.” Ex. 1006, 8:66-67. This is consistent with the ’728 Patent. Ex.1001, 7:12-17; see also Mot. 8. Antonio further teaches that “user terminal measures the beam strength of each beam identified in the most recent BMM received from the gateway ... by measuring the amount of energy in a pilot signal associated with the beam” and generates a PSMM with “beam identifiers from BMM 600 and

corresponding beam strength values.” Ex. 1006, 9:11-29, 10:16-18; see also Pet. 44-45. Accordingly, Antonio’s PSMM message is generated in response to receiving the BMM message and pilots from the gateway. Ex. 1025, ¶ 68. It would have been obvious to a POSITA that when receiving a plurality of periodic BMMs and pilots, the mobile terminal would send a corresponding plurality of PSMMs. *Id.*

Id. at 18–19. Patent Owner does not argue this limitation. See MTA Reply 11–12. Based on the arguments and evidence presented, we find the cited art teaches this limitation.

“determine from at least one of the plurality of uplink transmissions if the receiving device should operatively associate with a different beam downlink transmission”

With regard to this limitation, Petitioner relies on Alastalo and Antonio. MTA Opp. 19–20 (citing Ex. 1025 (Winters Decl.) ¶ 70).

Petitioner argues:

As discussed above, Alastalo and Antonio teach that the access point is configured to receive a plurality of PSMMs sent from the receiving mobile terminal in response to the plurality of BMMs through the phased array antenna. Further, as discussed in the Petition, Alastalo and Antonio teach that the access point determines from a PSMM if the receiving mobile terminal should operatively associate with a different beam downlink transmission. Pet. 45-49; Ex. 1025, ¶ 71.

MTA Opp. 20. Patent Owner does not argue this limitation. See MTA Reply 11–12. Based on the arguments and evidence presented, we find the cited art teaches this limitation.

“wherein the determination is based at least in part on an angular parameter”

Petitioner contends, “Alastalo and Antonio render obvious, **in multiple ways**, that ‘the determination is based at least in part on an angular parameter,’ as recited in Substitute Claim 18.” MTA Opp. 20 (citing Ex. 1025 (Winters Decl.) ¶ 72) (emphasis added). Petitioner argues:

First, as explained in the Petition, Antonio’s PSMM includes beam strength values for the beams identified in the BMM. Pet. 28, 44-54; Ex.1003, ¶¶ 41, 79-83; Ex. 1006, 9:57-59. XR’s expert, Dr. [S]hort, conceded that “[i]f you have signal strength within a beam... you have some angle information.” Ex 1029, 128:10- 17; see also Ex. 1027, 18:15-18. Antonio further teaches that the received PSMM is used to “determine[] a new active beam set (step 512).” See Ex. 1006, 9:11-13, 10:16-18, 10:65-11:2. Ex. 1025, ¶ 73. Accordingly, Antonio’s PSMM includes both beam strength and angle information to determine the new active beam set.

Second, Antonio discloses “an inner beam (beam 1), middle beams (beams 2–7), and outer beams (beams 8–16).” Ex. 1006, 7:12-14. Each of these beams has different angles (both inclination angle and radial angle) relative to the transmitter (e.g., gateway). Ex. 1025, ¶ 74. Antonio teaches “adjust[ing] one or more of the measured beam strength values using the one or more pilot adjust values that can optionally be sent from the gateway in a PAM.” Ex. 1006, 9:30-51. For example, if “outer beams are made stronger than the inner and middle beams,” then the outer beams might ordinarily be selected more often. Ex. 1006, 9:37-41. Antonio’s beam strength adjustments prevent this problem by “balance[ing] the load evenly among the beams.” Ex. 1006, 9:41-45. Because the adjusted beam strength values in the PSMM are adjusted based on each beam’s angle (e.g., whether it is an inner beam or outer beam), a POSITA would have understood that the adjusted beam strength values in the PSMM each comprise an angular parameter. Ex. 1025, ¶ 74. XR’s Dr. Short agrees that the angle of the beam affects signal strength. Ex. 1028, 158:2-23; see also Ex. 1029, 126:24-127:4. As discussed in the Petition, beam selection is based on beam

strength values in the PSMM. Pet. 32, 42, 46-47. Accordingly, in this additional way, Antonio teaches this limitation. Ex. 1025, ¶ 74.

Third, Antonio teaches using a beam strength threshold to determine the beams in the new active beam set. Specifically, Antonio teaches “compar[ing] the strength of the strongest beam (SSB)...to the strength of the strongest alternate beam (SSAB)” and “[i]f SSB minus SSAB is less than or equal to a first threshold (T₁), ...the [base station] adds the strongest alternate beam...to the new active beam set.” Ex.1006, 11:34-42, 12:18-25. The threshold helps “reduc[e] handoffs due to temporary beam signal strength fluctuations caused by, among other things, **specular reflection**.” Ex. 1006, 12:37-43. A POSITA would have understood that the threshold includes an angle parameter since it is used to reduce handoffs due to specular reflection. Ex. 1025, ¶ 75.

Indeed, Antonio’s threshold disclosure is similar to the ’728 Patent’s embodiment of Figure 5, where a client device is disassociated with the current beam “when the best beam testing indicates a better beam whose average RSSI exceeds the average RSS of the current beam by a Best Beam Threshold (e.g., default 10dB).” Ex. 1001, 10:1-7. Regarding the Figure 5 embodiment, XR’s expert, Dr. Short, conceded that “**angle is inherently considered** when determining the right beam or the wrong beam” using “received signal strength indication.” Ex. 1029, 126:17-127:14. Thus, for the same reasons, angle is also inherently considered in Antonio when it compares the beam signal strength to the threshold to determine the beams in the new active beam set. Ex. 1025, ¶ 76.

MTA Opp. 20–22. Patent Owner does not argue this limitation. See MTA Reply 11–12. Based on the arguments and evidence presented, we find the cited art teaches this limitation.

“each of the plurality of downlink transmittable messages includes a null data frame”

Petitioner contends that Alastalo, Antonio, and Schiff render this limitation as recited in the context of claim 18 obvious. MTA Opp. 23 (citing Ex. 1025 (Winters Decl.) ¶ 79). Petitioner argues that, “as discussed in the Petition and above, Alastalo and Antonio teach that the access point transmits a plurality of BMM’s and associated pilots.” *Id.* (citing Pet. 53–55; Ex. 1006, 8:56–67; Ex. 1025 ¶ 80).

Schiff teaches, “[t]he pilot channel is simply a signal that is not modulated by data, and may use a repetitive unchanging pattern or non-varying frame structure type input (pattern)” and “the pilot signal generally has a constant value, such as all 1’s or 0’s, or a well known repetitive pattern, such as a structured pattern of interspersed 1’s and 0’s.” Ex. 1021, Ex. 1021, 13:37–45. Schiff also teaches, “[i]n addition, a pilot signal is non-power controlled. That is, the pilot signal is transmitted at a preselected fixed power level, which is not varied so that accurate measurements of signal power are achieved by user terminals.” *Id.* at 13:46–50. We find that Schiff teaches transmission of downlink messages that include a null data frame.

Antonio teaches, “[t]he user terminal measures the beam strength of each beam identified in the most recent BMM received from the gateway” (Ex. 1006, 9:11–13) and “[i]n one embodiment, the user terminal measures a beam strength by measuring the amount of energy in a pilot signal associated with the beam” (*id.* at 9:15–17). Antonio states that one technique for measuring pilot signal strength is the technique disclosed in Schiff and incorporates by reference the application from which Schiff issued, U.S. Patent Appl. No. 08/722,330, filed September 27, 1996. Ex. 1006, 9:24–29; *see also* Ex. 1021, at codes (21) (22). Based on these passages, Petitioner asserts, “[t]hus, Antonio expressly teaches the

combination with Schiff.” MTA Opp. 23. With further regard to motivation to combine, Petitioner states: “[i]t would have been obvious to implement Antonio’s pilot signal associated with the BMM per Schiff’s teachings because Antonio suggests the combination” (MTA Opp. 24 (citing Ex. 1006, 9:24–29; Ex. 1025 (Winters Decl.) ¶ 74)) and “[a] POSITA would have had a reasonable expectation of success, as evidenced by Antonio itself” (*id.* (citing Ex. 1025 ¶ 83)). Based on this evidence, we find that a motivation to combine the relevant teachings of the cited references existed.

Patent Owner argues that Petitioner has failed to show that the plurality of uplink transmissions (as recited in the previous limitation that recites “receive a plurality of uplink transmissions sent from the receiving device in response to the plurality of downlink transmittable messages through the phased array antenna”) “would be sent from the receiving device ***in response to*** a plurality of downlink transmittable messages that each includes Schiff’s pilot signal.” MTA Reply 12. We do not find this argument persuasive. Petitioner responds:

[Patent Owner] improperly argues the references separately, when [Petitioner] relied on an obviousness combination.

[Patent Owner] does not dispute that in the proposed combination of Alastalo and Antonio, “[t]he user terminal measures the beam strength of each beam identified in the most recent BMM received from the gateway ... by measuring the amount of energy in a pilot signal associated with the beam” and that in response to measuring the pilot signals the terminal generates a PSMM with the “beam identifiers from BMM 600 and corresponding beam strength values.” Opposition at 18-19, 23; *see also* Pet. 44-45. Also, [Patent Owner] does not dispute that in the combination, the pilot “includes a null data frame.” Opposition, at 23-24.

Accordingly, in the combination relied on by [Petitioner], the “PSMM message is generated in response to receiving the

BMM message and pilots from the gateway,” and the pilots include “a null data frame.” Opposition, 19, 23-24.

MTA Sur-Reply 12. We agree with Petitioner.

Petitioner has shown that each and every limitation recited in claim 18 is taught by the prior art and has shown a motivation to combine the relevant teachings of the cited references as recited in claim 18. For these reasons, we conclude that proposed substitute claim 18 would have been obvious in view of the combination of Alastalo, Antonio, the IEEE 802.11 Handbook, and Schiff, and deny the motion to amend on this basis.⁹

III. CONCLUSION¹⁰

For the foregoing reasons, we conclude that Petitioner has established, by a preponderance of the evidence that claim 16 is unpatentable. Patent Owner’s Motion to Amend is denied.

⁹ Thus, we have determined that Patent Owner’s Motion to Amend should be denied on two independent and sufficient bases: (1) a limitation sought to be added is not supported by the written description; and (2) the substitute claim would have been obvious. We, therefore, do not reach the other issues raised by the Patent Owner’s Motion to Amend including the additional arguments Petitioner presents as to why the Motion to Amend should be denied. No implications especially regarding the merits should be drawn from our failure to decide these issues. The only reason we do not decide these issues is because it is unnecessary for us to do so.

¹⁰ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

In summary:

Reference(s)	Basis	Claim	Claim Shown Unpatentable	Claims Not shown Unpatentable
Alastalo and Antonio	§ 103	16	16	
Alastalo, Antonio, and the WTEC Report	§ 103	16	16	
Overall Outcome			16	

Motion to Amend Outcome	Claim
Original Claim Cancelled by Amendment	16
Substitute Claim Proposed in Amendment	18
Substitute Claim: Motion to Amend Granted	
Substitute Claim: Motion to Amend Denied	18
Substitute Claims: Not reached	

IV. ORDER

Accordingly, it is:

ORDERED that claim 16 of U.S. Patent No. 7,729,728 B2 has been shown to be unpatentable;

FURTHER ORDERED that Petitioner's Motion to Amend is denied; 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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