

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 IPR2018-00764
Patent 7,062,296 B2

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

PARVIS, *Administrative Patent Judge*.

FINAL WRITTEN DECISION

Determining that the Challenged Claims are Unpatentable
Denying Patent Owner's Motion to Amend
Denying Petitioner's Motion to Strike
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 claims 1, 2, 4–7, 17, 18, 20–23, 33, and 35–38 (“the challenged claims”) of U.S. Patent No. 7,062,296 B2 (Ex. 1001, “the ’296 Patent”). XR Communications, LLC d/b/a Vivato Technologies (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). Upon consideration of the parties’ contentions and supporting evidence, we instituted an *inter partes* review pursuant to 35 U.S.C. § 314, as to the challenged claims of the ’296 Patent. Paper 10 (“Inst. Dec.”).

After institution, Patent Owner filed a Patent Owner Response (Paper 18, “PO Resp.”); Petitioner filed a Reply (Paper 27, “Pet. Reply”); and Patent Owner filed a Sur-Reply (Paper 32, “PO Sur-Reply”). Also, the parties filed motions, including Patent Owner’s Motion to Amend (Paper 19, “Mot. to Amend”), oppositions, and replies, when appropriate. *See infra* §§ II.G–II.I. A transcript of the hearing held on June 18, 2019, has been entered into the record as Paper 45 (“Tr.”).

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has demonstrated by a preponderance of evidence that the challenged claims of the ’296 Patent are unpatentable. Additionally, we deny Patent Owner’s Motion to Amend.

A. *Related Matters*

As required by 37 C.F.R. § 42.8(b)(2), each party identifies judicial and administrative matters that would affect, or be affected by, a decision in this proceeding. In particular, the parties inform us that the ’296 Patent is the subject of additional district court proceedings as follows: XR

Communications, LLC d/b/a Vivato Technologies v. ARRIS International plc et al., 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 d/b/a Vivato Technologies v. Newo Corp. 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 et al.*, 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.*, Case No. 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. 8–9; Paper 5, 2–4.

The parties further state the '296 Patent is the subject of other petitions for *inter partes* review in Case No. IPR2018-00725, in which a Final Written Decision was entered on September 4, 2019, and Case No. IPR2018-01017, which is pending. Pet. 8–9; Paper 5, 2–4; Paper 15.

B. The '296 Patent

The '296 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 '296 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, omnidirectional antennas. *Id.* at 2:25–31.

Figure 1 of the '296 Patent is reproduced below.

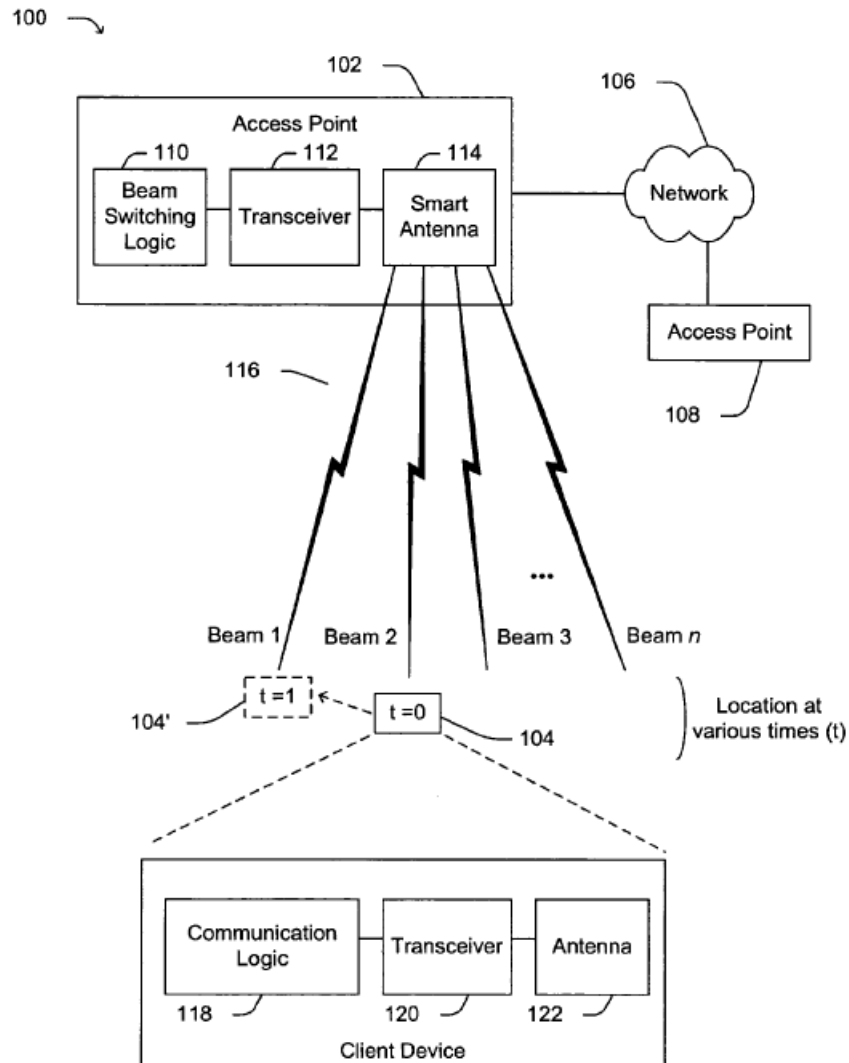


Fig. 1

Figure 1 of the '296 Patent, above, illustrates 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 of the '296 Patent, access point 102 includes beam switching logic 110, smart antenna 114, and transceiver 112, which is coupled to beam 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. Illustrative Claim

Petitioner challenges claims 1, 2, 4–7, 17, 18, 20–23, 33, and 35–38 of the ’296 Patent. Pet. 7–8. Claims 1, 17, and 33 are independent claims. Each of claims 2, 4–7, 18, 20–23, and 35–38 depends, directly or indirectly, from one of claims 1, 17, and 33. Independent claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A method for use in a wireless communication system, the method comprising:
 - configuring a first device having a smart antenna to selectively allow a second device to operatively associate with a beam downlink transmittable to said second device using said smart antenna;
 - configuring said first device to determine information from at least one uplink transmission receivable from said second device through said smart antenna;
 - configuring said first device to determine if said associated second device should operatively associate with a different beam downlink transmittable using said smart antenna based on said determined information; and

if said associated second device should operatively associate with a different beam, then configuring said first device to allow said second device to operatively associate with said different beam by at least one of configuring said first device to identify that said second device is allowed to operatively associate with said different beam, or configuring said first device to identify that said second device is not allowed to operatively associate with said beam.

Ex. 1001, 10:57–11:11.

D. Instituted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 19):

Challenged Claims	Basis	Reference(s)
Claims 1, 6, 7, 17, 22, 23, 33, 37, and 38	§ 103 ¹	U.S. Patent No. 5,890,067 (“Chang,” Ex. 1005) and U.S. Patent No. 6,208,858 B1 (“Antonio,” Ex. 1006)
Claims 2 and 18	§ 103	Chang, Antonio, and Campbell ²
Claims 4, 5, 20, 21, 35, and 36	§ 103	Chang, Antonio, and U.S. Patent No. 5,548,813 (“Charas,” Ex. 1007)

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103. Because the ’296 Patent was filed before the effective date of the relevant amendment, the pre-AIA version of § 103 applies.

²Andrew T. Campbell et al., *Design, Implementation, and Evaluation of Cellular IP*, IEEE PERSONAL COMMUNICATIONS, August 2000 (“Campbell,” Ex. 1008).

The earliest priority date claimed for the '296 Patent is November 4, 2002. Ex. 1001, (60). Chang issued on March 30, 1999 (Ex. 1005, (45)); Antonio issued March 27, 2001 (Ex. 1006, (45)); and Charas issued August 20, 1996 (Ex. 1007, (45)). Campbell was published in August 2000. Ex. 1008, 1. Chang, Antonio, Charas, and Campbell qualify as prior art to the '296 Patent.

As support, Petitioner submits a Declaration of Jack Winters, Ph.D., who has been retained by Petitioner for the instant proceeding.

Ex. 1003 ¶ 1. In support of its Opposition to the Motion to Amend, Petitioner proffers an additional declaration of Dr. Winters. Ex. 1025.

Patent Owner submits a Declaration of Robert Short, Ph.D., who has been retained by Patent Owner for the instant proceeding. Ex. 2002 ¶ 1. In support of its Motion to Amend, Patent Owner proffers an additional Declaration of Dr. Short. Ex. 2004.

II. DISCUSSION

A. *Principles of Law Relating to Obviousness*

A patent claim is unpatentable 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.

35 U.S.C. § 103(a). 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 skill in the art; and (4) objective evidence of

nonobviousness, i.e., secondary considerations.³ *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441, F.3d 977, 988 (Fed. Cir. 2006)).

B. Level of Ordinary Skill

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). Petitioner contends, relying on the testimony of Dr. Winters, that a person of ordinary skill in the art would have had a Master’s degree in electrical engineering and two years of smart antenna design experience. Pet. 16 (citing Ex. 1003 ¶ 18). Petitioner contends that a “[l]ack of work experience can be remedied by additional education, and vice versa.” *Id.* Patent Owner does not dispute Petitioner’s proposed level of ordinary skill or propose an alternative. *See generally* PO Resp.; Tr. 33:5–15, 50:2–5.

Therefore, we adopt Dr. Winters’s assessment of a person with ordinary skill in the art because it is consistent with the problems and solutions in the prior art of record. We further note that the prior art of

³ The record does not include evidence of objective indicia of nonobviousness.

record in the instant proceeding reflects the appropriate level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (“the prior art itself reflects an appropriate level” of ordinary skill in the art).

C. Claim Construction

In an *inter partes* review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2017).⁴

Relying on the '296 Patent Specification and the testimony of Dr. Winters, Petitioner contends that “a [person having ordinary skill in the art (POSITA)] would have understood that the broadest reason[able] interpretation of ‘*logic*,’ includes ‘hardware, firmware, software, digital logic, analog logic,” as well as other forms of circuitry such as processing units, computer instructions, and combinations of the aforementioned examples. Pet. 17 (citing Ex. 1001, 4:49–60; Ex. 1003 ¶¶ 31–33).

Consistent with Petitioner’s contentions, the '296 Patent Specification states

Before describing the exemplary methods and apparatuses, it should first be understood that as used herein, the term “logic” is meant to convey a broad range of implementation capabilities and/or design choices, and is not meant to limit the scope of the

⁴ The claim construction standard to be employed in an *inter partes* review changed. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2017) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018). At the time of the filing of the Petition in this proceeding, however, the applicable claim construction standard was set forth in 37 C.F.R. § 42.100(b)(2017).

methods and apparatuses to just digital logic circuitry. By way of example, in certain implementations, the term “logic” may include hardware, firmware, software, digital logic, analog logic, other forms of circuitry, memory, data, processing units, computer instructions, input/output devices, a combination of one or more of these and/or any other form of technology capable of performing at least a part of the methods and/or apparatuses described herein.

Ex. 1001, 4:48–60.

Relying on the '296 Patent Specification and the testimony of Dr. Winters, Petitioner contends that “a POSITA would have understood that the broadest reasonable interpretation of a ‘*smart antenna*’ includes ‘*an adaptive antenna or a phased array antenna.*’” Pet. 17–18 (citing, *e.g.*, Ex. 1001, 1:61–2:2, 4:36–39, 5:12–15; Ex. 1003 ¶¶ 34–37). Consistent with Petitioner’s contentions, the '296 Patent Specification describes “[o]ne example of a smart antenna” is described in a patent entitled “Wireless Packet Switched Communication Systems And Networks Using Adaptively Steered Antenna Arrays” and the base station described therein “includes a phased array antenna panel.” Ex. 1001, 1:61–2:2; *see also id.* at 4:36–39 (describing “for example, the smart antenna may include a directional/adaptive antenna”); 5:12–15 (describing “smart antenna 114 may include one or more phased array antenna panels”).

Patent Owner does not dispute Petitioner’s contentions or provide alternative proposed constructions. *See generally* PO Resp. Furthermore, the parties assert with respect to the challenged claims that no claim construction issues are in dispute. Tr. 7:4–7, 19:22–25. We agree with Petitioner’s contentions regarding claim construction and credit the testimony of Dr. Winters as we find that both are consistent with the evidence of record. We, therefore, adopt Petitioner’s proposals for the

reasons given in the Petition, as well as those discussed above. We determine that no other claim terms need express construction to resolve the parties' controversies. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017), *cert. denied*, 138 S. Ct. 1695 (April 30, 2018) (noting that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'") (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

*D. Obviousness over Chang and Antonio—
Independent Claims 1, 17, and 33 and
Dependent Claims 6, 7, 22, 23, 37, and 38*

Petitioner contends each of claims 1, 6, 7, 17, 22, 23, 33, 37, and 38 is unpatentable, under 35 U.S.C. § 103(a), as obvious over Chang and Antonio. Pet. 19–56. Patent Owner opposes. *See generally* PO Resp. In our discussion below, we first provide a brief overview of the prior art, and then we address the parties' contentions in turn.

1. Overview of Chang

Chang is directed to multi-beam adaptive antenna arrays in which the communication channel follows the mobile unit. Ex. 1005, (54), 1:8–10. Figure 3 of Chang is reproduced below.

FIG. 3

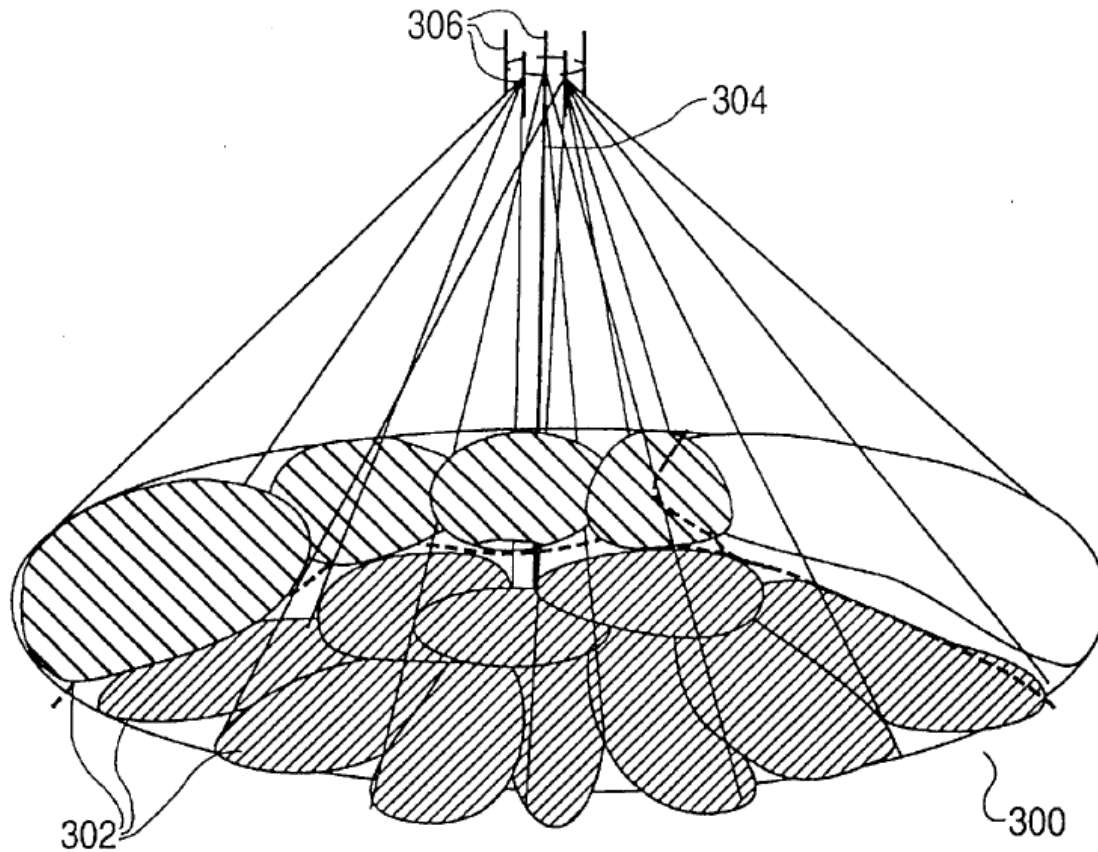


Figure 3 of Chang, above, illustrates an adaptive array antenna system including adaptive antenna array 304 having antennas 306. *Id.* at 5:6–12. Adaptive antenna array 304 transmits forward channels and receives corresponding reverse channels. *Id.* at 5:17–18. As shown in Figure 3, each one of beam spots 302 in cell 300 is produced from antennas 306 in multi-beam adaptive antenna array 304. *Id.* at 5:7–10. A beam forming network located at the base of adaptive antenna array 304 controls the amplitude and phase of the signals transmitted by antennas 306 to adjust the beam spots 302. *Id.* at 5:17–23.

Figure 4 of Chang is reproduced below.

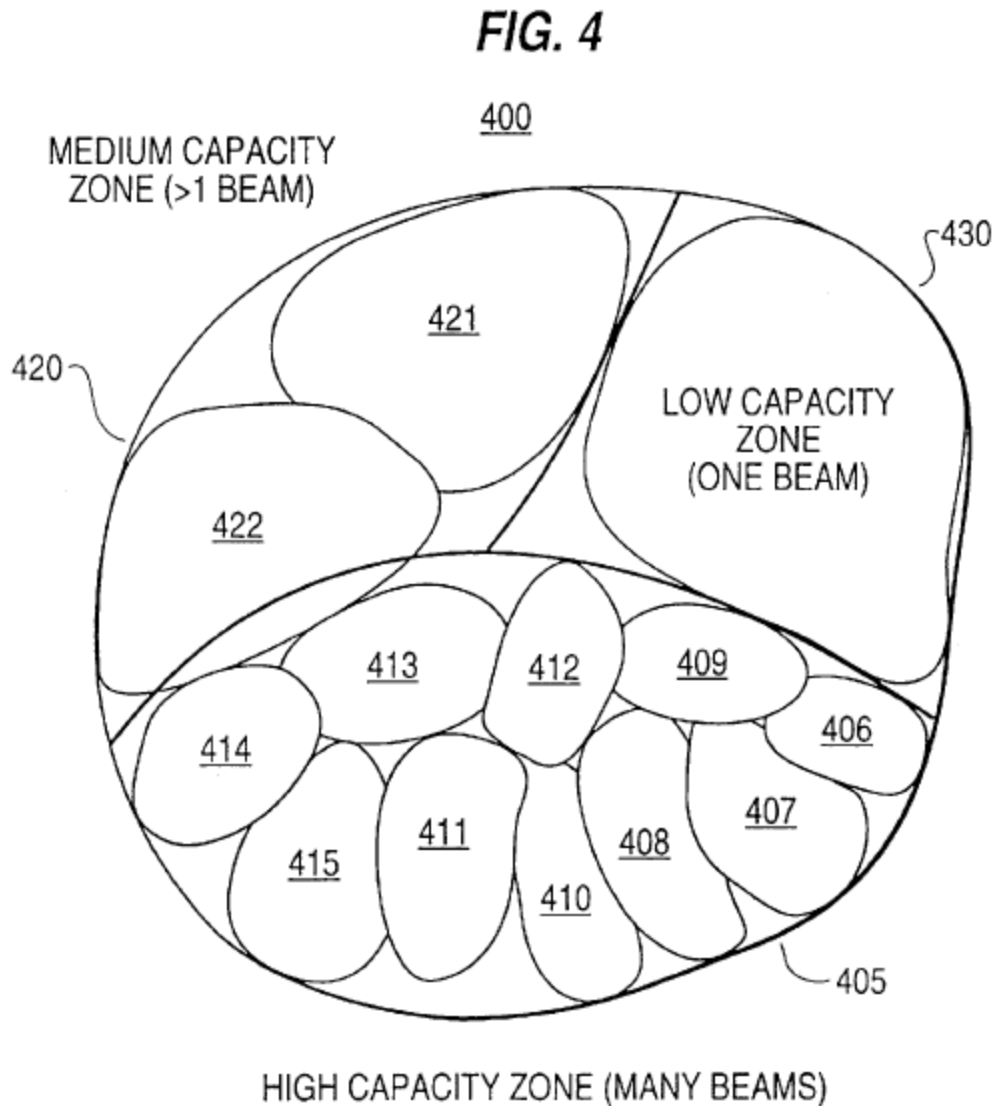


Figure 4 of Chang, above, illustrates cell 400 divided into zones and further divided into beam spots. *Id.* at 5:28–31, Fig. 4. In particular, cell 400 is divided into high capacity zone 405, medium capacity zone 420, and low capacity zone 430. *Id.* at 5:31–33. As further shown in Figure 4, zone 405 includes beam spots 406 through 415, zone 420 includes beam spots 421 and 422, and zone 430 includes beam spot 430. *Id.* at 5:36–38.

2. Overview of Antonio

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.

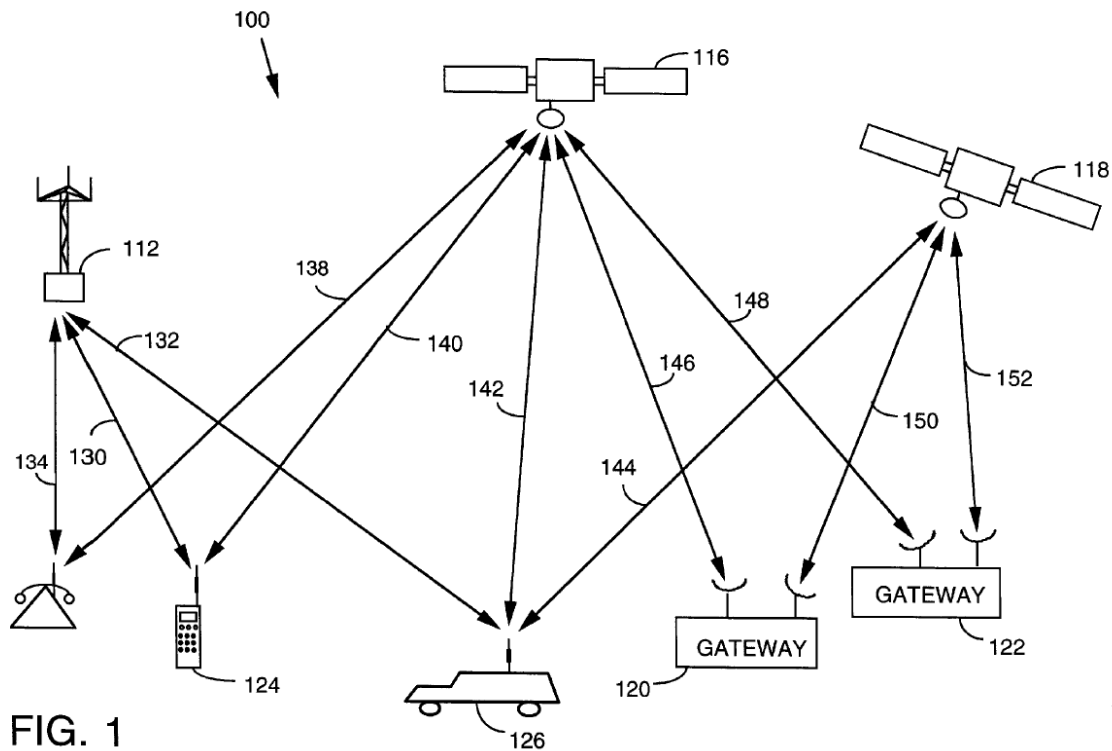


Figure 1 of Antonio, above, illustrates system 100 having base station 112, satellites 116 and 118, gateways 120 and 122, and user terminals 124, 126, and 128. *Id.* at 6:1–5. Base station 112 projects beams within a cell covering a predetermined service area on the Earth's surface. *Id.* at 7:25–27. Each of user terminals 124, 126, and 128 is a wireless communication device. *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. *Discussion of Claim 1*

We begin our analysis with independent claim 1. Petitioner asserts that the combination of Chang and Antonio renders claim 1 obvious. Pet. 19–40. Petitioner provides detailed explanations as to how the prior art combination purportedly teaches or suggests each limitation of claim 1, and provides purported reasons why one of ordinary skill would have combined the prior art teachings, citing Dr. Winters’s testimony for support. *Id.* (citing *e.g.*, Ex. 1003 ¶¶ 48–112).

Patent Owner counters that Petitioner fails to present reasoning to apply Antonio’s teachings to Chang’s system. *See generally* PO Resp. Patent Owner does not dispute that the combined teachings of Chang and Antonio teach or suggest each limitation of claim 1. *Id.*

Upon review of the arguments and evidence in the current record, we find that Petitioner has shown how the combined teachings of Chang and Antonio teach or suggest each limitation of claim 1. Additionally, we find that Petitioner articulates reasoning to combine the teachings in the manner

recited in claim 1 and that Patent Owner’s arguments and evidence do not undermine Petitioner’s showing.

a. Limitation-by-Limitation Analysis

Regarding the preamble of claim 1, which recites “[a] method for use in a wireless communication system” (Ex. 1001, 10:57–58), Petitioner contends “*Chang* discloses the preamble, to the extent that it is limiting” and points to *Chang*’s teaching of a method of communicating wirelessly between a mobile unit and a base station. Pet. 28 (citing *e.g.*, Ex. 1005, 1:12–14, 3:50–64; Ex. 1003 ¶¶ 58–61).⁵ Regarding the first element in claim 1 referred to by Petitioner as “1.1,” i.e., “configuring a first device having a smart antenna to selectively allow a second device to operatively associate with a beam downlink transmittable to said second device using said smart antenna” (Ex. 1001, 10:59–61),⁶ Petitioner points to *Chang*’s teachings relating to the adaptive antenna array, as well as the assignment of channels in a beam spot to mobile units, and cites to Dr. Winters’s testimony as support. Pet. 28–31 (citing, *e.g.*, Ex. 1005, 2:7–8, 3:63–4:4, 5:17–18, 6:1–11, Fig. 4; Ex. 1003 ¶¶ 62–74).

Regarding “a smart antenna” recited in element 1.1, Dr. Winters testifies that *Chang* “teaches a base station (‘a first device’) having an adaptive antenna array.” Ex. 1003 ¶¶ 63–64 (citing, *e.g.*, Ex. 1005, (54),

⁵ For the purposes of this Decision, we assume, without deciding, that the preamble is limiting because we are persuaded by Petitioner’s showing.

⁶ In particular, Petitioner refers to “configuring a first device having a smart antenna to selectively allow a second device to operatively associate with a beam” as element “1.1.1” and “downlink transmittable to said second device using said smart antenna” as element “1.1.2.” Pet. 28, 30.

3:64–4:4) (cited at Pet. 29). For the reasons given above in Section II.C regarding claim construction, we adopt Petitioner’s proposal that “a POSITA would have understood that the broadest reasonable interpretation of a ‘*smart antenna*’ includes ‘*an adaptive antenna or a phased array antenna.*’” Pet. 17–18.

We agree with Petitioner’s contentions and we credit and give significant weight to the testimony of Dr. Winters because we find both are consistent with the evidence of record. For instance, Chang discloses “an *adaptive antenna array* for providing reconfigurable beam-spots within a predefined area, each beam-spot containing one or more channels assigned to mobile units.” Ex. 1005, 3:64–67 (emphasis added); *see also id.* at 6:1–11 (providing further details regarding assigning channels).

Also relying on Dr. Winters’s testimony, Petitioner asserts that a person having ordinary skill in the art would have understood that Chang’s “beam-spot 412, which includes the forward channel, is a downlink transmission.” Pet. 30–31 (citing *e.g.*, Ex. 1005, 2:7–8, 3:66–67, 5:17–18, 6:1–11; Ex. 1001, 3:13; Ex. 1011, (57); Ex. 1003 ¶¶ 72–74); *see also id.* at 21–22 (citing, *e.g.*, Ex. 1005, 2:5–10, 3:64–4:4; Ex. 1003 ¶¶ 39–40). Dr. Winters testifies that a person having ordinary skill in the art would have understood that Chang’s communication channels “include forward traffic channels for downlink communications from the base station to the mobile units and reverse traffic channels for uplink communications from the mobile units to the base station.” *See, e.g.*, Ex. 1003 ¶ 40 (cited in Pet. 22).

We agree with Petitioner’s contentions and we credit and give significant weight to the testimony of Dr. Winters because we find both are consistent with the evidence of record. For instance, Chang describes that

“[e]ach communication channel 116 through 118 includes a pair of actual communication frequencies: a forward channel (the communication channel from the base station to the mobile unit) and a reverse traffic channel (the communication channel from the mobile unit to the base station).”

Ex. 1005, 2:5–10; *see also id.* at 5:17–18 (“[a]daptive antenna array 304 transmits forward channels and receives corresponding reverse channels”).

We find that Petitioner shows that the subject matter of the preamble and first element in claim 1 (i.e., 1.1) are taught by the asserted art.

We next turn to the remaining elements in claim 1, referred to by Petitioner as “1.2,” “1.3,” and “1.4,” respectively (Pet. 32, 33, 35, 36, 38), which are reproduced below.

- [1.2] configuring said first device to determine information from at least one uplink transmission receivable from said second device through said smart antenna;
- [1.3] configuring said first device to determine if said associated second device should operatively associate with a different beam downlink transmittable using said smart antenna based on said determined information;
- [1.4] if said associated second device should operatively associate with a different beam, then configuring said first device to allow said second device to operatively associate with said different beam by at least one of configuring said first device to identify that said second device is allowed to operatively associate with said different beam, or configuring said first device to identify that said second device is not allowed to operatively associate with said beam.

Ex. 1001, 10:63–11:11.⁷ For the second and third elements in claim 1, (i.e., 1.2 and 1.3), Petitioner points to Chang’s teaching of using received signal strength to switch between beam spots, and cites to Dr. Winters’s testimony as support. Pet. 32–33 (citing, *e.g.*, Ex. 1005, 2:8–10, 3:59–64, 5:17–18, 6:3–11; Ex. 1003 ¶¶ 76–89). Regarding element 1.2, Dr. Winters testifies that “a POSITA would have understood that communication received over Chang’s reverse channel is an ‘*uplink transmission*’” and that “to determine information” recited in element 1.2 is taught by Chang’s system sensing that the reverse channel is stronger. Ex. 1003 ¶¶ 76–80 (citing, *e.g.*, Ex. 1005, 2:8–10, 3:59–63, 6:3–9). Regarding, element 1.3, Dr. Winters testifies that Chang’s description of “based on the stronger signal strength in beam-spot 409, the base station switches from transmitting over beam-spot 412 to transmitting over beam-spot 409” teaches “to determine if said associated second device should operatively associate with a different beam downlink transmittable using said smart antenna based on said determined information” recited in element 1.3. Ex. 1003 ¶¶ 81–89 (citing, *e.g.*, Ex. 1005, 5:17–18, 6:1–11, Fig. 4).

We agree with Petitioner’s contentions and we credit and give significant weight to the testimony of Dr. Winters that Chang teaches

⁷ In particular, Petitioner refers to “if said associated second device should operatively associate with a different beam, then configuring said first device to allow said second device to operatively associate with said different beam by at least one of” as element “1.4.1”; “configuring said first device to identify that said second device is allows to operatively associate with said different beam, or” as element “1.4.2”; and “configuring said first device to identify that said second device is not allowed to operatively associate with said beam” as element “1.4.3.” Pet. 35, 36, 38.

elements 1.2 and 1.3 because we find Petitioner's contentions and Dr. Winters's testimony consistent with the evidence of record. For instance, Chang discloses:

When the mobile unit is in a beam-spot, for example, beam-spot 412, the multi-beam antenna system transmits the forward channel to only beam-spot 412. As the mobile unit moves into a neighboring beam-spot, for example, beam-spot 409, *the system senses that the reverse channel signal (the communication channel from the mobile unit to the base station) is stronger* in this new beam-spot and consequently turns off the forward channel from beam-spot 412 and turns on the same forward channel signal to beam-spot 409. Thus, *the system switches the transmitted channel between the beam-spots* to follow the mobile unit.

Ex. 1005, 6:1–11 (emphases added); *see also id.* at 3:59–61 (describing that “the method senses at the base station received signal strength of the mobile unit communicating in the cell”).

For element 1.4, Petitioner points to the combined teachings of Chang and Antonio, as well as the knowledge of one having ordinary skill in the art. Pet. 20–23, 35–40 (citing, *e.g.*, Ex. 1005, 6:1–11; Ex. 1006, 2:34–46, 3:10–12, 8:30–32, 10:65–11:2, 11:10–15, 13:12–15, 13:19–21; Ex. 1018, 112–13; Ex. 1003 ¶¶ 38–47, 90–112); *see also id.* at 23–28 (regarding reasoning to combine). Petitioner's reasoning to combine is discussed below in Section II.D.3.b.

Dr. Winters references his testimony for element 1.3 (*see, e.g.*, Ex. 1003 ¶ 91) and Dr. Winters testifies further as follows:

97. **First**, as discussed at [1.4.1], Chang's base station (“*first device*”) allows the mobile unit to operatively associate with beam-spot 409 by turning on the forward channel to beam-spot 409 (“*different beam*”) when the signal is stronger in beam-spot 409.

98. *Chang* does so because it is desirable for the mobile unit to associate with beam-spot 409 when that beam's signal is stronger. *Chang* at 6:5–11. A POSITA would have understood that, in some situations, beam-spot 409 may be blocked, rendering the forward channel in beam-spot 409 unusable, resulting in interruption in communication services. Antonio at 8:30–32, 2:34–46.

Ex. 1003 ¶¶ 97–98.

Dr. Winters also testifies “Antonio teaches that a base station selects multiple beams having stronger signal strength as the beams for communication between the base station and the user terminal (i.e., mobile unit)”; “Antonio’s base station includes identifiers of the selected beams (having stronger signal strengths) in an ‘add beam set’”; and “[i]n Antonio, the base station transmits the add beam set to the user terminal, which then associates with the identified beams for communication with the base station.” *Id.* ¶¶ 99–101 (citing, *e.g.*, Ex. 1006, 10:65–11:2, 11:10–15, 13:12–17, 13:33–36). Dr. Winters testifies, therefore, “Antonio’s base station ‘*identifies*’ that the user terminal should and is allowed to operatively associate with the beams (‘*different beam*’) in the add beam set” recited in element 1.4. *Id.* ¶ 102. Dr. Winters additionally testifies that “Antonio’s base station also generates a ‘drop beam set’” and

[b]y including in the drop beam set identifiers of beams (having weaker signal strengths) that should not be used for communication and by transmitting the drop beam set to the user terminal, Antonio’s base station “*identifies*” that the user terminal is not allowed to operatively associate with the identified beam (“*said beam*”).

Ex. 1003 ¶¶ 108–109 (citing Ex. 1006, 13:12–15).

We agree with Petitioner’s contentions and we credit and give significant weight to the testimony of Dr. Winters that the combination of

Chang and Antonio teach element 1.4 because we find Petitioner's contentions and Dr. Winters's testimony are both consistent with the evidence of record. For instance, Antonio describes a process for determining the most desirable beams for transmission, which begins as follows: "the gateway transmits a Beam Mask Message (BMM) to the user terminal over the established communication link(s)," which "contains a list of beam identifiers . . . over which the gateway can transmit data or information." Ex. 1006, 8:51–60 (cited in Pet. 23; Ex. 1003 ¶¶ 45–47). According to Antonio, "[t]he user terminal measures the beam strength of each beam identified in the most recent BMM received from the gateway" and transmits a "Pilot Strength Measurement Message (PSMM) to the gateway," which "contains one or more beam identifiers from BMM 600 and corresponding beam strength values." *Id.* at 9:11–13, 9:57–59, 10:16–18 (cited in Pet. 23, 61; Ex. 1003 ¶¶ 45–47, 189, 190). Antonio further describes "[a]fter receiving a PSMM from the user terminal, the gateway determines a new active beam set," which is "the set of beams that should be used as communication links between the gateway and the user terminal." *Id.* at 10:65–11:2. Antonio's procedure starts with step 804 in which "the gateway selects the strongest beam in the PSMM and adds that beam to the new active beam set." *Id.* at 11:10–15.

Antonio discloses details regarding switching to the new active beam set as follows:

In a preferred embodiment, the beam handoff is a "soft" beam handoff. That is, the gateway will not break the connections in the current active beam set until it receives confirmation from the user terminal that the user terminal is successfully receiving information on the beam(s) in the new active beam set. Consequently, as 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). 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 add beam set and a drop beam set. The add beam set contains a beam identifier for each beam within the new active beam set that is not in the current active beam set. It is possible for the add beam set to be empty, in which case the HDM will only contain the drop beam set. The drop beam set contains a beam identifier for each beam in the current active beam set that is not in the new active beam set.

Id. at 13:3–21.

Petitioner’s limitation-by-limitation analysis is not disputed by Patent Owner. *See generally* PO Resp. Accordingly, upon review of the evidence in the record, we find that Petitioner has shown how the combined teachings of Chang and Antonio teach or suggest each limitation of claim 1.

b. Reasoning to Combine Chang and Antonio

We find that Petitioner articulates reasoning to combine the teachings in the manner recited in claim 1; and that Patent Owner’s arguments and evidence do not undermine Petitioner’s showing. Relying on the testimony of Dr. Winters, Petitioner provides reasons why a person having ordinary skill in the art would have combined the teachings of Chang and Antonio and explains how the teachings would have been combined. Pet. 20–27 (citing *e.g.*, Ex. 1003 ¶¶ 38–112). For instance, relying on the testimony of Dr. Winters, Petitioner asserts that a person having ordinary skill in the art would have applied Antonio’s technique to Chang’s system “to produce the obvious, beneficial, and predictable results of providing alternative communication beams and reducing call dropping rates.” *Id.* at 23–24

(citing *e.g.*, Ex. 1003 ¶¶ 48–57); *see also id.* at 38, 39 (citing *e.g.*, Ex. 1003 ¶¶ 103, 110) (describing that a person having ordinary skill in the art would have applied Antonio’s technique to Chang’s system “to yield the predictable results of reducing instances of dropped calls”). Petitioner also asserts that Chang and Antonio are analogous prior art as both pertain to the same field of endeavor. *See, e.g., id.* at 24 (citing *e.g.*, Ex. 1005, 1:54–65, Fig. 4; Ex. 1006, 6:1–5, Figs. 1, 2B; Ex. 1003 ¶ 49).

In his first Declaration in support of the Petition, Dr. Winters testifies regarding Chang as follows:

Chang teaches that when the mobile unit moves from within a coverage area of a first beam (e.g., beam-spot 412) to a coverage area of a second beam (e.g., beam-spot 409), the base station turns off the communication link of the first beam and turns on the communication of the second beam. Chang at 6:1–11. A POSITA, however, would have recognized that, in some situations, the communication link of the second beam (e.g., beam-spot 409) may not remain optimal for communication with the mobile unit even when the mobile unit is within the coverage area of the second beam. For instance, a POSITA would have recognized that after moving in the coverage area of the second beam, the mobile unit may experience blockage by physical objects such as trees, buildings, etc., and this may significantly deteriorate the communication link of the second beam. *See Antonio*, 8:30-32. In such situations, an active call between the base station and the mobile unit may be dropped. Ex. 1003 ¶ 51 (cited at Pet. 25).

Dr. Winters testifies regarding Antonio as follows:

Notably, Antonio recognized the above situation where “blockage by physical objects such as trees, buildings, etc. may render even the ‘best beam(s) unusable.’” Antonio at 8:31-32. To address this, Antonio teaches a technique that beneficially provides a plurality of alternative beams for communication between the base station and the mobile units to decrease call

dropping rates. Antonio at Abstract (“The beams that should be used are the beams that if used will **decrease the call dropping rates** and provide a desired level of beam source diversity.”).

Ex. 1003 ¶ 52 (cited at Pet. 25). Dr. Winters testifies “in more detail” regarding Antonio’s techniques, including sending the BMM and PSMM as discussed above in the limitation-by-limitation analysis. *Id.* ¶ 53 (cited at Pet. 26).

Dr. Winters testifies regarding reasoning to apply Antonio’s techniques to Chang’s system as follows:

By selecting and identifying multiple beams for communication, as Antonio teaches, if one beam were rendered unusable due to, for example, blockage by physical objects, the communication could continue over another one of the multiple beams. [Ex. 1006,] 2:9-15. In this way, instances of dropped calls would be reduced. *Id.* Also, a POSITA would have recognized that in Antonio if the currently used beam is experiencing interference the base station would have to increase transmission power for that beam, or it could beneficially transmit at a lower power on the next strongest available beam within the beam set. Accordingly, a POSITA would have understood that by employing Antonio’s above noted techniques to select multiple beams for communication, as Antonio teaches, Chang’s mobile units would be provided with alternatives for receiving communication from the base station. Therefore, it would have been obvious to a POSITA to apply Antonio’s above noted techniques to Chang’s known system to yield predictable and beneficial results of (1) providing multiple alternative beams for communication, (2) decreasing call dropping rates, and (3) minimizing transmission power.

Ex. 1003 ¶ 54 (cited at Pet. 26).

Dr. Winters testifies further that a person having ordinary skill in the art “would have recognized that Chang turns off the communication link of the first beam without initially establishing the communication link of the

second beam.” *Id.* ¶ 55 (citing *e.g.*, Ex. 1005, 6:3–9). Dr. Winters testifies with Antonio’s technique “the communication will not break until it receives confirmation that a connection is successfully established on the new beam” and, therefore, “it would have been obvious to a POSITA to apply Antonio’s above techniques to Chang’s known system to yield predictable and beneficial results of providing alternative beams for communication and avoid dropping a call.” *Id.*

Relying on the testimony of Dr. Short, Patent Owner asserts that (1) the Petition fails to demonstrate a motivation to combine (PO Resp. 8–13; PO Sur-Reply 1–14); and (2) the Petition does not show that a person having ordinary skill in the art would have known how to combine the teachings of Chang and Antonio in the manner proposed or that such person would have had a reasonable likelihood of success (PO Resp. 13–21; PO Sur-Reply 14–25).

We start with Patent Owner’s assertion that the Petition fails to demonstrate a motivation to combine. PO Resp. 8–13; PO Sur-Reply 1–14. Patent Owner, more specifically, asserts Dr. Winters’s deposition testimony shows he did not form a conclusion that a person of ordinary skill in the art “would have” combined Chang with Antonio (PO Resp. 8–10; PO Sur-Reply 1–7); and that Petitioner’s alleged problem in Chang does not exist (PO Resp. 11–13; PO Sur-Reply 8–14).

We agree with Petitioner that Patent Owner’s assertion that Dr. Winters’s deposition testimony shows he did not form a conclusion that a person of ordinary skill in the art “would have” combined Chang with Antonio (PO Resp. 8–10; PO Sur-Reply 1–7) is based on Dr. Winters’s deposition testimony taken out of context. Pet. Reply 10–13. For instance,

consistent with Petitioner's contentions, in support of the Petition, Dr. Winters testifies regarding Chang that "[a] POSITA . . . *would have recognized* that, in some situations, the communication link of the second beam (e.g., beam-spot 409) may not remain optimal" and "a POSITA *would have recognized* that after moving in the coverage area of the second beam, the mobile unit may experience blockage" such that "an active call between the base station and the mobile unit may be dropped." Ex. 1003 ¶ 51 (emphases added). Dr. Winters also testifies "a POSITA *would have recognized* that in Antonio if the currently used beam is experiencing interference the base station would have to increase transmission power for that beam, or it could *beneficially* transmit at a lower power on the next strongest available beam within the beam set" and "a POSITA *would have understood* that by employing Antonio's above noted techniques to select multiple beams for communication, as Antonio teaches, Chang's mobile units would be provided with alternatives for receiving communication from the base station." *Id.* ¶ 54 (emphases added). Dr. Winters further testifies "[t]herefore, it would have been obvious to a POSITA to apply Antonio's above noted techniques to Chang's known system to yield *predictable and beneficial results* of (1) providing multiple alternative beams for communication, (2) decreasing call dropping rates, and (3) minimizing transmission power." *Id.* (emphasis added). Dr. Winters testifies regarding an additional, independent reason that a person having ordinary skill in the art "*would have recognized* that Chang turns off the communication link of the first beam without initially establishing the communication link of the second beam" and "it would have been obvious to a POSITA to apply Antonio's above techniques to Chang's known system to yield *predictable*

and beneficial results of providing alternative beams for communication and avoid dropping a call.” *Id.* ¶ 55 (emphases added).

The aforementioned testimony of Dr. Winters is exemplary, as Dr. Winters testifies further regarding why a person having ordinary skill in the art would have been motivated to combine Chang’s and Antonio’s teachings and also testifies to support that Chang and Antonio are analogous prior art and pertain to the same field of endeavor. *See, e.g., Ex.*

1003 ¶¶ 38–55, 103, 110. That Dr. Winters testified in his deposition that a person having ordinary skill in the art would have considered possibly including Antonio’s teachings in Chang’s system in connection with his testimony that Chang and Antonio are analogous prior art and pertain to the same field of endeavor (*see, e.g., Ex.* 2003, 109:24–110:13) further supports Petitioner’s contentions regarding reasoning to combine and is contrary to Patent Owner’s assertion (PO Resp. 8–10; PO Sur-Reply 1–7).

Additionally, in his Declaration again in connection with his testimony that Chang and Antonio are analogous prior art and pertain to the same field of endeavor, Dr. Winters testifies a person having ordinary skill the art “when considering the teachings of Chang *would have also considered* the teachings of Antonio.” *Ex.* 1003 ¶ 49 (emphasis added).

We also are not persuaded by Patent Owner that Dr. Winters’s deposition testimony regarding costs analysis undermines his other testimony and shows he did not form a conclusion that a person of ordinary skill in the art “would have” combined Chang with Antonio. PO Resp. 9–10 (citing, *e.g., Ex.* 2003, 110:11–111:9, 112:9–113:3); PO Sur-Reply 2–3, 5–7. Dr. Winters testifies in his deposition that a person having ordinary skill in the art would have had “an expectation of what the improvement is” and “a

reasonable expectation that there would be an improvement.” Ex. 2003, 111:25–113:3.

Additionally, Patent Owner’s assertion regarding costs is related to Patent Owner’s assertion discussed below that a person having ordinary skill in the art would not have known how to make the proposed combination and would not have had a reasonable expectation of success. For the reasons set forth below, we are persuaded by Petitioner’s analysis that a person having ordinary skill in the art would have been able to make the proposed combination and would have had a reasonable expectation of success, and we do not find that Patent Owner’s arguments and evidence undermine Petitioner’s showing. Upon consideration of the evidence of record, we find Dr. Winters’s declaration testimony (Ex. 1003; Ex. 1025) and deposition testimony (Ex. 2003) are consistent and we credit and give significant weight to Dr. Winters’s testimony, over the testimony of Dr. Short, including Dr. Winters’s testimony addressed above that one having ordinary skill in the art would have been motivated to modify Chang in light of Antonio for the reasons given by Dr. Winters. *See, e.g.*, Ex. 1003 ¶¶ 38–55, 103, 110.⁸

Furthermore, even though not necessary for our determination, we note that simply because “a given combination would not be made by businessmen for economic reasons does not mean that persons skilled in the

⁸ We note that we reach the same determination based on our findings regarding Dr. Winters’s first Declaration (Ex. 1003) without, for example, consideration of his second Declaration. Additionally, although not necessary for our determination, Dr. Winters testifies in his second Declaration “I have not withdrawn or changed by opinions contained in my first Declaration.” Ex. 1025 ¶ 7.

art would not make the combination because of some technological incompatibility.” *In re Farrenkopf*, 713 F.2d 714, 718 (Fed. Cir. 1983); *Velandier v. Garner*, 348 F.3d 1359, 1368, 1379 (Fed. Cir. 2003) (“expense, time, and effort involved” are distinct from likelihood of success). Also, as our reviewing court explains, the existence of better alternatives “does not mean that an inferior combination is inapt for obviousness purposes.” *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)).

We turn to the parties contentions regarding whether a person having ordinary skill in the art would have recognized that in Chang’s system a mobile unit may experience blockage. As discussed in the summary above, Dr. Winters testifies that a person having ordinary skill in the art would have recognized in Chang’s system, after moving in the coverage area of the second beam, the mobile unit may experience blockage by physical objects such as trees, buildings, etc., and as a result, the communication link of the second beam may deteriorate. Ex. 1003 ¶ 51. Relying on the testimony of Dr. Short, Patent Owner asserts that Petitioner’s alleged problem in Chang does not exist. *See, e.g.*, PO Resp. 11–13 (citing *e.g.*, Ex. 2002 ¶¶ 39–77). Dr. Short testifies that the alleged problem in Chang does not exist because Chang teaches “chang[ing] beams in response to beam deterioration even when a mobile device has not moved.” *Id.* ¶¶ 39–47 (citing *e.g.*, Ex. 1005, 6:3–9, 6:12–14, 6:17–19). Dr. Short, more specifically, testifies that “Chang describes a system that considers several alternative beams and makes a selection among those available beams based on which has the strongest measured reverse channel signal—not simply based on whether or not the

mobile device has moved.” *Id.* ¶¶ 45–56 (citing, *e.g.*, Ex. 1005, 6:3–14, 6:17–19, 7:7–8, 7:16–20, 7:23–28, Fig. 7).

On this record, upon weighing the testimony of Dr. Winters (*see, e.g.*, Ex. 1003 ¶¶ 38–57, 103, 110) and Dr. Short (Ex. 2002 ¶¶ 39–57) we credit and give significant weight to the testimony of Dr. Winters over Dr. Short because we find Dr. Winters’s testimony is consistent with the evidence of record. Consistent with Dr. Winters’s testimony and contrary to Dr. Short’s testimony, in the portions of Chang relied upon by Dr. Short, Chang teaches that the beam switching is made when the mobile unit moves. For instance, Chang teaches “[a]s the mobile unit *moves* into a neighboring beam-spot” the system detects the stronger channel and “the system switches the transmitted channel between the beam spots to *follow the mobile unit.*” Ex. 1005, 6:1–11 (emphases added) (cited at *e.g.*, Ex. 1003 ¶ 51). Chang refers to the techniques as “channel-*following*” and describes that it “is not difficult to implement,” for example, “[p]referably, the determination as to which beam-spot a mobile unit is in is implemented by a scanning receiver and control receiver.” *Id.* at 6:12–22 (emphasis added).

Consistent with the testimony of Dr. Winters (*see, e.g.*, Ex. 1003 ¶¶ 38–57, 103, 110), in the portions of Chang identified by the parties, Chang describes determining the location of the mobile unit only in connection with the mobile unit in motion. *See, e.g.*, Ex. 1005, 5:56–6:24, 7:7–8, 7:16–20, 7:23–28, Fig. 7. Even in the portions of Chang described with respect to Figures 7 and 8, Chang describes “a slow moving mobile.” *Id.* at 7:7–26. That Chang describes “[i]f the mobile unit is neither a fast nor medium speed mobile, it is, by default, a slow mobile” (*id.* at 7:7–8) is consistent with the testimony of Dr. Winters that a person having ordinary

skill in the art would have recognized “that *after* moving,” that the mobile unit may experience blockage, and the artisan would further have understood by employing Antonio’s technique, the mobile units would have been provided with alternatives. Ex. 1003 ¶¶ 51–54; *see also* Ex. 1025 ¶ 11 (“Chang never discussed switching beams in response to an obstruction, nor does Chang contemplate switching beams for a mobile unit that remains within the coverage area of a single beam-spot.”).

As further evidence disputing that Chang has the asserted problem, Patent Owner provides Dr. Short’s testimony that “[t]he Petition’s theory only addresses the situation where a mobile unit switches ***between beam spots within a zone.***” Ex. 2002 ¶ 69. Dr. Short testifies that, in that situation, Chang teaches using a “shared, zone-wide control channel” that results in “no handoff.” Ex. 2002 ¶¶ 66–73 (citing Ex. 1005, 5:29–39, 5:61–67, 6:3–9, Fig. 4). The Petition and Dr. Winters’s testimony, however, pertain to the following: “*after moving in the coverage area* of the second beam, the mobile unit may experience *blockage by physical objects such as trees, buildings, etc.*, and this may significantly deteriorate the communication link of the second beam.” Ex. 1003 ¶ 51 (emphases added). Again, the portions of Chang relied upon by Dr. Short teach making beam switches within a zone when the mobile unit is moving. For instance, Chang describes that “no handoff is required for a mobile unit *moving between beam-spots* in a zone. Instead, the communication channel pair . . . simply *follows the mobile unit.*” Ex. 1005, Ex. 5:56–57, 5:61–67 (emphasis added). Chang also includes Figure 4 and states that it is “a top down diagram of a cell divided into zones and further divided into beam-spots” and “[i]n practice, the system dynamically rearranges and disperses zones based on

mobile density and movement patterns such that cells may have different numbers of zones.” *Id.* at 5:29–39, Fig. 4. We find nothing in Chang’s teachings that undermines Dr. Winters’s testimony that “a POSITA would have recognized that *after moving* in the coverage area of the second beam, the mobile unit may experience blockage” such that “an active call between the base station and the mobile unit may be dropped.” Ex. 1003 ¶ 51 (emphasis added); *see also id.* ¶ 98 (testifying “in some situations, beam-spot 409 [the “different” beam spot] may be blocked, rendering the forward channel in beam-spot 409 unusable, resulting in interruption in communication services.”).⁹

We credit Dr. Winters’s testimony that, “Chang never discusses switching beams in response to *an obstruction*, nor does Chang contemplate switching beams for a mobile unit that *remains within the coverage area of a single beam-spot*” (Ex. 1025 ¶ 11) and “Chang does not address the situation where an obstruction is experienced while ***within*** the coverage area of the second beam” (*id.* ¶ 12). In addition to the reasons given above, we find Dr. Winters’s testimony is consistent with Chang’s Figure 7 illustrating beam 410 having minimal overlap. Ex. 1005, Fig. 7. Also, a person having ordinary skill in the art would have known that the spatial response from a subscriber may change very rapidly as the subscriber moves over a small distance. Ex. 1018, 112–13 (cited at Pet. 37).

Importantly, consistent with the testimony of Dr. Winters regarding reasoning to combine Chang and Antonio and Petitioner’s contentions (*see*,

⁹ Additionally, no handoff pertains to only for movement within a zone, whereas in “[a] mobile unit moving into or out of a zone performs handoff with the new zone or cell.” Ex. 1005, 5:56–67.

e.g., Pet. 23–28; Ex. 1003 ¶¶ 49–57, Pet. Reply 8–9; Ex. 1025 ¶¶ 11, 18), Antonio describes, that its technique provides a solution to blockage and, more specifically, to blockage experienced in a small area. For example, Antonio describes as background, prior art “[d]ropping calls in a communication system is a serious problem for service providers who strive to provide uninterrupted communication services,” and “[w]hat is, therefore, needed is a system and method for reducing call dropping rates,” which “should maintain a desired level of beam source diversity to further enhance the reliability of the communication system.” Ex. 1006, 2:36–51. Antonio describes “the inventors have designed a beam handoff procedure for choosing the most desirable beam(s) for a user terminal to receive traffic on” and that Antonio’s “procedure is aimed at reducing hand off rates and call dropping rates while maintaining a desired level of beam source diversity.” *Id.* at 8:24–40 (cited at Ex. 1003 ¶¶ 51–52); *see also id.* at 2:62–65 (describing that Antonio “provides a system and method for reducing call dropping rates” and for “maintain[ing] a desired level of beam source diversity.”). Antonio specifically describes multi-beam and beam switching techniques that work when blockage is experienced in a small area. *See id.* at 8:30–32 (“blockage by physical objects such as trees, buildings, etc. may render the ‘best beam(s)’ unusable.”).

Accordingly, we agree with Petitioner’s assertion and credit Dr. Winters’s testimony (*e.g.*, Ex. 1003 ¶¶ 49–57) that a person having ordinary skill in the art would have recognized that in Chang, after moving in the coverage area of the second beam, the mobile unit may experience blockage by physical objects such as trees, buildings, etc. and that this blockage may significantly deteriorate the communication link of the second

beam; and that such person would have combined the teachings of Antonio with Chang to reduce hand off rates and call dropping rates while maintaining a desired level of beam source diversity. For this reason alone, we are persuaded by Petitioner’s reasoning to combine and do not find that Patent Owner’s arguments and evidence undermine Petitioner’s showing.

As discussed above, Dr. Winters testifies regarding an additional, independent reason to combine the teachings of Chang and Antonio relating to applying Antonio’s soft handoff technique in Chang. In particular, Dr. Winters testifies that a person having ordinary skill in the art “would have recognized that Chang turns off the communication link of the first beam without initially establishing the communication link of the second beam” and that a person having ordinary skill in the art “would have recognized this could also lead to an active call being dropped.” *Id.* ¶ 55 (citing *e.g.*, Ex. 1005, 6:3–9). Dr. Short testifies that “this alleged problem—that Chang may drop a call during a beam transition if the new beam is blocked by an obstruction—does not exist.” Ex. 2002 ¶¶ 57–61. Dr. Short, more specifically, testifies “a beam switch only occurs when the system measures a stronger reverse channel signal in a new beam spot compared to the currently selected beam,” so “there is no realistic possibility in Chang that the process of switching beams will itself lead to a dropped call due to the new beam being obstructed.” *Id.* ¶¶ 62–65 (citing *e.g.*, Ex. 1005, 6:3–9, 6:12–14, 6:17–19). We find that the portions of Chang relied upon by Dr. Short, which are the same as those discussed above with respect to Petitioner’s first reason to combine, do not pertain to obstruction or blockage of a stationary mobile unit for the reasons previously discussed.

Also, Chang is consistent with Dr. Winters's testimony. *See, e.g.*, Ex. 1005, 6:3–9

Furthermore, Dr. Winters testifies that a person having ordinary skill in the art would have combined Antonio with Chang to resolve Chang's problem because with Antonio's technique "the communication will not break until it receives confirmation that a connection is successfully established on the new beam" and, therefore, "it would have been obvious to a POSITA to apply Antonio's above techniques to Chang's known system to yield predictable and beneficial results of providing alternative beams for communication and avoid dropping a call." Ex. 1003 ¶ 55. Consistent with Dr. Winters's testimony, Antonio discloses "[i]n a preferred embodiment, the beam handoff is a 'soft' beam handoff," such that "the gateway will not break the connections in the current active beam set until it receives confirmation from the user terminal that the user terminal is successfully receiving information on the beam(s) in the new active beam set." Ex. 1006, 13:3–8. In accordance with that embodiment "[o]nce the user terminal begins receiving information on the beams identified in the add beam set, the user terminal will stop receiving information on the beams identified in the drop beam set." *Id.* at 13:33–36.

As further evidence regarding its dispute of Petitioner's contention that a person having ordinary skill in the art would have been motivated to use Antonio's soft handoff in Chang, Patent Owner provides Dr. Short's testimony that "Chang expressly undermines" Petitioner's reasoning by teaching "that failure to keep up with handoffs may result in dropped calls" and "[t]he Petition suggests that a POSA would have been motivated to *add handoffs*" to Chang. PO Resp. 13; Ex. 2002 ¶¶ 74–78 (citing, *e.g.*, Ex. 1005,

2:33–27, 5:61–67). Consistent with Petitioner’s contentions and Dr. Winters’s testimony (Pet. 27, Ex. 1003 ¶¶ 55–57; Pet. Reply 15–17; Ex. 1025 ¶¶ 14–15, 25), however, we find that Chang does not discredit, discourage, or criticize soft handoffs or Antonio’s technique. In the portions of Chang relied upon by Dr. Short, Chang describes the problem of dropped calls with respect to only certain handoffs, i.e., “*conventional* handoff algorithms have difficulty in completing handoffs *quickly enough to keep up with a mobile unit moving quickly*, that is, a *fast* mobile unit” (Ex. 1005, 2:33–37 (emphases added)) and that within a zone “no handoff is required for a mobile unit *moving between beam-spots in a zone*” (*id.* at 5:61–67 (emphases added)). Regarding hard handoff, Chang simply teaches

[a]s the mobile unit moves into a neighboring beam-spot, for example, beam-spot 409, the system senses that the reverse channel signal (the communication channel from the mobile unit to the base station) is stronger in this new beam-spot and consequently turns off the forward channel from beam-spot 412 and turns on the same forward channel signal to beam-spot 409.

Ex. 1005, 6:3–9. Furthermore, Dr. Short’s testimony is not consistent with Antonio’s description of its technique “*reducing hand off rates* and call dropping rates while maintaining a desired level of beam source diversity.” Ex. 1006, 8:38–40 (emphasis added).

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). We find that the aforementioned teachings in Chang, as well as Chang as a whole, do not criticize, discredit, or otherwise discourage

use of Antonio's techniques and, therefore, Chang's teachings do not teach away from or undermine Petitioner's proposed combination.

Upon weighing the testimony of Dr. Winters and Dr. Short, we credit and give significant weight to the testimony of Dr. Winters over Dr. Short because we find Dr. Winters's testimony consistent with the evidence of record for the reasons given above. For the additional, independent reason that a person having ordinary skill in the art would have had, that Chang would have been improved by using Antonio's technique of not breaking communication until confirmation is received (*see, e.g.*, Ex. 1003 ¶ 55), we are persuaded by Petitioner's reasoning to combine and do not find that Patent Owner's arguments and evidence undermine Petitioner's showing.

We turn to Patent Owner's assertion that the Petition does not show that a person having ordinary skill in the art would have known how to combine the teachings of Chang and Antonio in the manner proposed or that such person would have had a reasonable likelihood of success. PO Resp. 13–21; PO Sur-Reply 14–25. Patent Owner, more specifically, asserts (1) the Petition does not explain how a person having ordinary skill would have reconciled contradictory teachings in Chang and Antonio (PO Resp. 13–14, 18–20; PO Sur-Reply 17); (2) Dr. Winters's testimony is conclusory (PO Resp. 15–18; PO Sur-Reply 16–24); and (3) the Petition fails to show a reasonable expectation of success (PO Resp. 20–21).

We start with Petitioner's contentions that a person having ordinary skill in the art would have been able to make the proposed combination, would have known how to implement the proposed combination, and would have had a reasonable expectation of success. Pet. 20–27 (citing *e.g.*, Ex. 1003 ¶¶ 38–112). Petitioner relies on Dr. Winters's testimony, for

example, that “a POSITA when considering the teachings of Chang would have also considered the teachings of Antonio, as they are analogous prior art and both pertain to the same field of endeavor of wireless communication systems including base stations communicating with a plurality of mobile units.” Ex. 1003 ¶ 49. Dr. Winters also testifies that “Chang and Antonio teach antenna systems that similarly use beams including communication links to enable wireless communication between the base station and the mobile units.” *Id.* (citing Ex. 1005, Fig. 4; Ex. 1006, Fig. 2B). Dr. Winters also testifies regarding details of Antonio that would have been applied to Chang and what the resulting combination of Chang’s and Antonio’s teachings would have been. *See, e.g., id.* ¶¶ 52–54. Furthermore, we find that Dr. Winters testifies that one having ordinary skill in the art would have been able to make the proposed combination, would have known how to combine the teachings of Chang and Antonio in the manner recited in claim 1, and would have had a reasonable expectation of success. *See, e.g., id.* ¶¶ 38–57, 96–112. For the reasons given below, we credit and give significant weight to Dr. Winters’s testimony (*id.*) over that of Dr. Short’s because we find Dr. Winters’s testimony consistent with the evidence of record.

We turn to Patent Owner’s assertion, which relies on the testimony of Dr. Short. that the Petition does not explain how a person having ordinary skill would have reconciled contradictory teachings in Chang and Antonio. PO Resp. 1–2, 13–14, 18–20; PO Sur-Reply 17; Ex. 2002 ¶¶ 80–98. Dr. Short testifies as follows:

90. For example, as discussed above, Chang’s system selects beams based on the *reverse* channel signal strength measurements taken at the base station. *See* Chang at 6:1–19.

By comparison, Antonio selects beams based on *forward* channel signal strength measurements taken at the *mobile unit*. See Antonio at 9:11–29.

91. Specifically, Antonio teaches the use of custom BMM messages to identify which beams the mobile unit should measure, and the mobile unit uses Antonio’s custom PSMM messages to record the measurement results and transmit them back to the base station. See Antonio at 8:55–9:10 (describing BMM); 9:11–29, 10:16–64 (describing remote unit measurements and the PSMM). Chang, on the other hand, does not have and has not been designed to use BMM and PSMM messages.

92. The Petition provides no explanation for *how* a POSA would reconcile those contradictory teachings for where or how the combined system should select beams.

Ex. 2002 ¶¶ 90–92; see also *id.* ¶ 96 (testifying that “the BMM and PSMM messages are custom messages that a mobile device cannot utilize or address unless it has been specifically programmed and designed to do so”).

Contrary to Dr. Short’s testimony set forth in paragraph 90, Petitioner proposes “[a] POSITA would have been motivated to *combine* the teachings of Chang and Antonio” and, more specifically, such person would have been motivated to apply Antonio’s techniques to address blockage experienced “after moving.” See, e.g., Pet. 23–25 (emphasis added); Ex. 1003 ¶ 51. In the portions of Chang relied upon by Dr. Short (Ex. 1005, 6:1–19), the mobile unit is moving, as discussed above. We, therefore, agree with Petitioner and credit and give significant weight to Dr. Winters’s testimony that the proposed combination is an improvement over Chang alone to resolve the problem of blockage “after moving.” See, e.g., Pet. 23–28; Pet. Reply 20–21; Ex. 1003 ¶¶ 51, 54–56 (testifying a person having ordinary skill in the art would have recognized that the combination would

have had “beneficial results”); Ex. 1025 ¶ 21 (testifying a person having ordinary skill in the art “would have known” Chang’s approach is “an estimate,” whereas Antonio’s approach is “more precise” and “Antonio’s teachings represent an improvement”).

Regarding Dr. Short’s testimony that Antonio uses custom messages that a mobile unit cannot use or address unless it has been specifically programmed and designed to do so (Ex. 2002 ¶¶ 91, 96), we are persuaded by Petitioner’s contentions and Dr. Winters’s testimony that making the proposed combination would have been within the level of ordinary skill in the art and do not find Petitioner’s showing undermined by Patent Owner’s arguments or evidence. Pet. 20–27 (citing *e.g.*, Ex. 1003 ¶¶ 38–112). Dr. Winters’s testimony, for example, identifies Antonio’s detailed teachings of BMM and PSMM messages that include “beam strength values corresponding to a plurality of alternative beams” and how such values result in an HDM message with beams to add and/or drop, and we are persuaded that such person would have been able to apply Antonio’s teachings in a system, such as Chang’s “analogous” system pertaining to the same field of endeavor. *See, e.g.*, Ex. 1003 ¶ 49–56 (citing, *e.g.*, Ex. 1005, 1:54–65, Fig. 4; Ex. 1006, 6:1–5, 8:56–9:13, 10:16–18, 10:65–11:2, 13:12–21, 13:30–36, Figs. 1, 2B)). We discuss below with respect to reasonable expectation of success more reasons we find that Patent Owner’s evidence regarding Antonio’s custom messages does not undermine Petitioner’s showing.

As additional support for Patent Owner’s assertion that the Petition does not explain how a person having ordinary skill would have reconciled

contradictory teachings in Chang and Antonio, Dr. Short further testifies as follows:

93. As another example, also discussed above, Chang’s system is designed to avoid the use of handoff for switching beams in order to prevent dropped calls. *See* Chang at 2:32–37 (“[C]onventional handoff algorithms have difficulty in completing handoffs quickly enough to keep up with a mobile unit moving quickly As a result, communication cut-off mid-conversation may occur[.]”). By comparison, Antonio teaches the using a “soft” handoff that includes “add beam set”/“drop beam set” messages for switching beams. *See* Antonio at 13:3–41 (“[T]he HDM [Handoff Direction Message] can contain two sets of beam identifiers, an[] add beam set and a drop beam set.”).

94. Again, the Petition provides no explanation for *how* a POSA should make the combination in light of the individual references’ contradictory teachings.

Ex. 2002 ¶¶ 93–94.

The aforementioned testimony is similar to Dr. Short’s testimony discussed above that “Chang expressly undermines” Petitioner’s reasoning by teaching “that failure to keep up with handoffs may result in dropped calls” and “[t]he Petition suggests that a POSA would have been motivated to *add handoffs*” to Chang. Ex. 2002 ¶¶ 74–78. For the reasons given above, upon weighing the testimony of Dr. Winters and Dr. Short, we credit and give significant weight to the testimony of Dr. Winters over Dr. Short because we find Dr. Winters’s testimony (*see, e.g.*, Ex. 1003 ¶¶ 48–57) consistent with the evidence of record, including Antonio’s disclosure that its technique reduces handoffs (Ex. 1006, 8:24–40). We find that a person having ordinary skill in the art would have recognized that Chang would have been improved by using Antonio’s technique of not breaking communication until confirmation is received, and, for the reasons above

and below, would have known how to implement Petitioner's proposed combination, and would have had a reasonable expectation of success.

We next turn to Patent Owner's assertion that Dr. Winters's testimony that a person having ordinary skill in the art would know how to make the proposed combination is conclusory. PO Resp. 15–18; PO Sur-Reply 16–24. We discuss Patent Owner's assertion in this regard in connection with the argument that the Petition fails to show a reasonable expectation of success. PO Resp. 20–21. When questioned during his deposition, Dr. Winters testified that Antonio describes in detail how its techniques are implemented and one having ordinary skill in the art would have understood from Antonio's teachings how to implement Antonio's messages into the processing system of Chang. *See, e.g.*, Ex. 2003, 113:18–25. As discussed above, Dr. Winters's Declaration testimony, for example, identifies Antonio's detailed teachings of BMM and PSMM messages that include “beam strength values corresponding to a plurality of alternative beams” and how such values result in an HDM message with beams to add and/or drop, and we are persuaded that a skilled artisan would have been able to apply Antonio's teachings in a system, such as Chang's “analogous” system pertaining to the same field of endeavor. *See, e.g.*, Ex. 1003 ¶ 49–56 (citing, *e.g.*, Ex. 1005, 1:54–65, Fig. 4; Ex. 1006, 6:1–5, 8:56–9:13, 10:16–18, 10:65–11:2, 13:12–21, 13:30–36, Figs. 1, 2B)). Petitioner and Dr. Winters's testimony also provide detailed discussion of Chang's and Antonio's teachings, how these teachings meet each limitation of the claim 1, how one having ordinary skill in the art would have combined the teachings, and why one having ordinary skill in the art would have had a reasonable expectation of success. Pet. 20–27 (citing *e.g.*, Ex. 1003 ¶¶ 38–112).

In addition to the reasons discussed above regarding the Petition and Dr. Winters's first Declaration (*id.*), we also are persuaded by Petitioner's responsive contentions and evidence that a person having ordinary skill in the art would have been able to make the proposed combination and would have had a reasonable expectation of success and we find Petitioner's showing is not undermined by Patent Owner's assertions or evidence. Dr. Winters testifies that the information for making the proposed combination would have been "well known" and "where the techniques have been well explained, it's possible to take those techniques and apply them to another system." Ex. 2003, 108:10–17, 114:7–10; Ex. 1003 ¶¶ 53–56 (testifying that Antonio provides "detail" that a person having ordinary skill in the art would have understood and modifications to Chang "would have been within the level of ordinary skill in the art"). Dr. Winters also testifies "Antonio enables a POSITA to apply the concept of BMM and PSMM messages to Chang's similar system, by describing in detail how he implements those techniques." Ex. 1025 ¶¶ 18–19. Dr. Winters again testifies regarding similarities between Chang and Antonio that "would have bolstered a POSITA's expectation that Antonio's multi-beam techniques could be successfully applied to Chang's system." Ex. 1025 ¶ 20; *see also* Ex. 1003 ¶ 49 (testifying both Chang and Antonio, for example, pertain to "base stations communicating with a plurality of mobile units" and "teach antenna systems that *similarly* use beams") (emphasis added), ¶¶ 38–47 (describing details of Chang's and Antonio's teachings in support of aforementioned testimony).

We again credit Dr. Winters's testimony over that of Dr. Short because Dr. Winters's testimony is consistent with the evidence of record.

For example, Chang describes that its system is modifiable by stating that “[i]t will be apparent to those skilled in the art that various modifications and variations can be made.” Ex. 1005, 7:64–65. Antonio describes that it “enable[s] any person skilled in the art to make or use the present invention.” Ex. 1006, 18:4–6.

Regarding Dr. Short’s testimony that Antonio uses custom messages that a mobile unit cannot use or address unless it has been specifically programmed and designed to do so (Ex. 2002 ¶¶ 91, 96) in addition to the reasons discussed above regarding Antonio’s detailed teachings set forth in the Petition and Dr. Winters’s first Declaration, we also are persuaded by Petitioner’s responsive contentions and evidence that a person having ordinary skill in the art would have been able to implement such specialized code and would have had a reasonable expectation of success. *See, e.g.*, Pet. Reply 20–25; Ex. 1025 ¶ 8, 19, 20, 22–27. We credit the testimony of Dr. Winters (Ex. 1025 ¶ 8, 19, 20, 22–27) over that of Dr. Short (Ex. 2002 ¶¶ 91, 96) because we find the evidence of record consistent with Dr. Winters’s testimony. For example, both Chang and Antonio describe that the techniques to be combined are implemented by computer program code. Ex. 1005, 5:18–27 (describing “hardware and/or software” control at the base); Ex. 1006, 15:66–16:6 (describing beam handoff control “implemented in a software-controlled processor programmed to perform the functions described herein” and “well known standard elements or generalized function or general purpose hardware . . . that operate under the control of special function software or firmware programming” perform the desired functions). Also, we find Dr. Winters’s testimony consistent with

the undisputed level of skill. Pet. 16 (citing Ex. 1003 ¶ 18); *see also* PO Resp.; Tr. 33:5–15, 50:2–5.

On this record, Petitioner has provided sufficient evidence to show that applying Antonio’s techniques in Chang’s system would not be “uniquely challenging or difficult for one of ordinary skill in the art” at the time of the invention. *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR*, 550 U.S. at 418). We agree with the Petition and Dr. Winters’s testimony that a person having ordinary skill in the art would have known how to combine the teachings of Chang and Antonio in the manner proposed and that such person would have had a reasonable expectation of success in doing so. We further find that Petitioner’s showing is not undermined by Patent Owner’s arguments or evidence.

Upon consideration of the contentions and evidence presented by both parties, we find that Petitioner shows that the subject matter of all elements in claim 1 are taught by the asserted art. Additionally, we find that Petitioner articulates reasoning to combine the teachings in the manner recited in claim 1 and Patent Owner’s assertions and evidence do not undermine Petitioner’s showing.

Accordingly, on this record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 1 is unpatentable, under 35 U.S.C. § 103(a), over Chang and Antonio.

4. *Discussion of Independent Claims 17 and 33*

Independent claims 17 and 33 are similar to claim 1. Petitioner’s showing with respect to claims 17 and 33 is similar to its showing with

respect to claim 1 and, indeed, Petitioner references its contentions for claim 1. Pet. 45–49, 50–56. Petitioner accounts for all differences in the claims. For instance, with respect to the recitation of “[a] computer-readable medium having computer executable instructions” in claim 17 and “logic operatively coupled to said transceiver” in claim 33, Petitioner points to teachings in Chang and Antonio and testimony of Dr. Winters. *Id.* at 45–47, 53–54 (citing *e.g.*, Ex. 1005, 5:17–27; Ex. 1006, 16:26–34, 17:23–56; Ex. 1003 ¶¶ 131–137, 163–168).¹⁰ Relying on Dr. Winters’s testimony, Petitioner also provides persuasive further reasoning to combine the teachings of Chang and Antonio in the manner recited in claims 17 and 33, for example, demonstrating that a person having ordinary skill in the art would have been motivated to store the software as instructions on computer-readable medium and cause a computer processor or logic to perform the desired functions. *Id.* We agree with Petitioner’s contentions and we credit and give significant weight to Dr. Winters’s testimony because we find both consistent with the evidence of record.

For example, consistent with Petitioner’s contentions and Dr. Winters’s testimony, Chang discloses

[a] beam forming network, located at the base of the adaptive antenna array 304, which may take the form of specialized hardware or general purpose computers, controls the amplitude and phase of the signals transmitted by the antennas 306 to adjust the beam-spots 302. Additionally, hardware and/or software at the base controls channel-following, traffic-

¹⁰ For the reasons given above in Section II.C, we adopt Petitioner’s proposed construction for the term “logic” because we agree with Petitioner’s contentions and we credit the testimony of Dr. Winters as we find that it is consistent with the evidence of record.

monitoring, and received signal strength monitoring, all discussed below, as well as any other control functions of the adaptive antenna array 304.

Ex. 1005, 5:18–27.

Also consistent with Petitioner’s contentions and Dr. Winters’s testimony, Antonio, for example, discloses

[c]ontrol or computer programs (also called computer control logic) are stored in main memory and/or secondary memory 1208. Such computer programs, when executed, enable the control unit 1120 to perform the features of the present invention as discussed herein. In particular, for example, the computer programs, when executed, enable the processor 1204 to perform measured beam strength value comparisons. Accordingly, such computer programs represent controllers of the control unit 1120.

Ex. 1006, 16:26–34.

Patent Owner does not argue these claims separately. *See generally* PO Resp. Based on the record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 17 and 33 are unpatentable, under 35 U.S.C. § 103(a), over Chang and Antonio.

5. *Discussion of Dependent Claims 6, 22, and 37*

We turn to Petitioner’s contentions regarding dependent claims 6, 22, and 37. Each of claims 6, 22, and 37 depends from claim 1, 17, or 33, respectively. Additionally, each of claims 6, 22, and 37 recites, for example, “[determining or determine] information about a current position of said second device relative to said smart antenna.” Ex. 1001, 11:61–63, 14:29–31, 16:25–26. Relying on the testimony of Dr. Winters, Petitioner points to Chang’s teachings relating to its scanning receivers and determining the mobile unit’s location by the scanning receivers, also relied upon for the

independent claims. Pet. 40–42, 49–50, 56 (citing *e.g.*, Ex. 1005, 5:9–11, 6:17–19, 7:10–14, Fig. 7; Ex. 1003 ¶¶ 113–120, 145–146, 176–177).

We agree with Petitioner’s contentions and we credit and give significant weight to Dr. Winters’s testimony because we find both consistent with the evidence of record. For example, consistent with Petitioner’s contentions and the testimony of Dr. Winters, Chang describes “scanning receivers 718” that “sense the mobile unit’s location, and a mobile unit moving through beam-spots.” Ex. 1005, 7:10–14.

Patent Owner does not argue these claims separately. *See generally* PO Resp. For the reasons given and on the record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 6, 22, and 37 are unpatentable, under 35 U.S.C. § 103(a), over Chang and Antonio.

6. *Discussion of Dependent Claims 7, 23, and 38*

We turn to Petitioner’s contentions regarding dependent claims 7, 23, and 38. Each of claims 7, 23, and 38 depends from claim 1, 17, or 33, respectively. Each of claims 7, 23, and 38 recites, for example, “[comparing/compare] said determined information to corresponding beam association threshold information.” Ex. 1001, 12:3–5, 14:38–40, 16:29–30. Petitioner points to the combined teachings of Chang and Antonio, including Chang’s teachings for the independent claims, discussed above in Sections II.D.3 and II.D.4, and Antonio’s disclosure of comparing a difference between signal strengths of beams to a corresponding threshold to determine whether a beam should be used for communication. Pet. 42–45, 50, 56 (citing *e.g.*, Ex. 1006, 11:34–42, 12:18–25, 12:37–55, 13:30–40;

Ex. 1003 ¶¶ 121–130, 147, 148, 178, 179). Additionally, relying on the testimony of Dr. Winters, Petitioner has articulated reasoning with rational underpinning to support the conclusion that one having ordinary skill would have had reason to apply the teachings of Antonio into Chang’s system, in the manner advanced by Petitioner. *Id.* at 43–45 (citing *e.g.*, Ex. 1006, 11:34–42, 12:18–25, 12:37–55, 13:30–40; Ex. 1003 ¶¶ 124–130).

We agree with Petitioner’s contentions and we credit and give significant weight to Dr. Winters’s testimony because we find both consistent with the evidence of record. For example, consistent with Petitioner’s contentions and the testimony of Dr. Winters, Antonio discloses performing a comparison with a first threshold to determine whether to add to a new active beam set a “strongest ‘alternate’ beam,” which is the strongest of any satellite beam within the PSMM that is projected by a satellite other than a satellite that projects a beam in the new active set. Ex. 1006, 11:33–42. Also consistent with Petitioner’s contentions and the testimony of Dr. Winters, Antonio describes performing a comparison with a second threshold of the difference between the strength of the strongest beam in the PSMM and the strength of the strongest alternate satellite beam in the current active set. *Id.* at 12:18–25, 12:37–55. Furthermore, consistent with Petitioner’s contentions and the testimony of Dr. Winters regarding reducing the chattering effect given for reasoning to combine, Antonio teaches that this scheme “achieves a lower handoff rate by smoothing out the chattering effect caused by beam signal strength fluctuations due to specular reflections.” *Id.*

Patent Owner does not argue these claims separately. *See generally* PO Resp. Based on the record before us, we determine that Petitioner has

demonstrated by a preponderance of the evidence that claims 7, 23, and 38 are unpatentable, under 35 U.S.C. § 103(a), over Chang and Antonio.

*E. Obviousness over Chang, Antonio, and Campbell—
Dependent Claims 2 and 18*

We turn to Petitioner’s contentions that dependent claims 2 and 18 are unpatentable, under 35 U.S.C. § 103(a), as obvious over Chang, Antonio, and Campbell. Pet. 76–80.

1. Overview of Campbell

Campbell is directed to wireless access to the Internet, which uses Internet Protocol (IP) addressing. Ex. 1008, 42. Campbell states that “Cellular IP” is a protocol that “incorporates a number of important cellular system design principles,” and “is built on a foundation of IP forwarding, minimal signaling, and soft-state location management.” *Id.* Campbell describes that Cellular IP access networks include a base station, which serves as a wireless access point and router of IP packets. *Id.* at 44.

2. Discussion of Dependent Claims 2 and 18

Each of claims 2 and 18 recites “wherein said first device includes an access point device and said second device includes a client device.” Ex. 1001, 11:12–14, 13:43–45. Petitioner points to Campbell’s teaching of a base station serving as a wireless access point and Chang’s teaching of mobile units as client devices. Pet. 79–80 (citing *e.g.*, Ex. 1005, 1:12–16, 1:39–41; Ex. 1008, 44; Ex. 1003 ¶¶ 274–283). Additionally, relying on the testimony of Dr. Winters, Petitioner has articulated reasoning with rational underpinning to support the conclusion that one having ordinary skill would have had reason to combine the teachings in the manner advanced by

Petitioner. *Id.* at 76–79 (citing *e.g.*, Ex. 1005, 1:6–10, 1:54–65, Fig. 1A; Ex. 1008, 42, 43; Ex. 1003 ¶¶ 269–273).

We agree with Petitioner’s contentions and we credit and give significant weight to Dr. Winters’s testimony because we find both consistent with the evidence of record. For example, consistent with Petitioner’s contentions and the testimony of Dr. Winters, Campbell discloses that “[t]he universal component of Cellular IP access networks is the *base station* which serves as a wireless access point and router of IP packets while performing all mobility-related functions.” Ex. 1008, 44. Also consistent with Petitioner’s contentions and the testimony of Dr. Winters, Campbell further discloses “mobile users equipped with wireless IP-enabled communicators will have access to a wide array of Web-based mobile multimedia services.” *Id.* at 42.

Patent Owner does not argue these claims separately. *See generally* PO Resp. Based on the record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 2 and 18 are unpatentable, under 35 U.S.C. § 103(a), over Chang, Antonio, and Campbell.

*F. Obviousness over Chang, Antonio, and Charas—
Dependent Claims 4, 5, 20, 21, 35, and 36*

We turn to Petitioner’s contentions that dependent claims 4, 5, 20, 21, 35, and 36 are unpatentable, under 35 U.S.C. § 103(a), as obvious over Chang, Antonio, and Charas. Pet. 57–76.

1. Overview of Charas

Charas is directed to a cellular radio communications system including mobile units, base stations, and a mobile telephone switching office. Ex. 1007, 1:8–10, 1:46–49. Figure 6 of Charas is reproduced below.

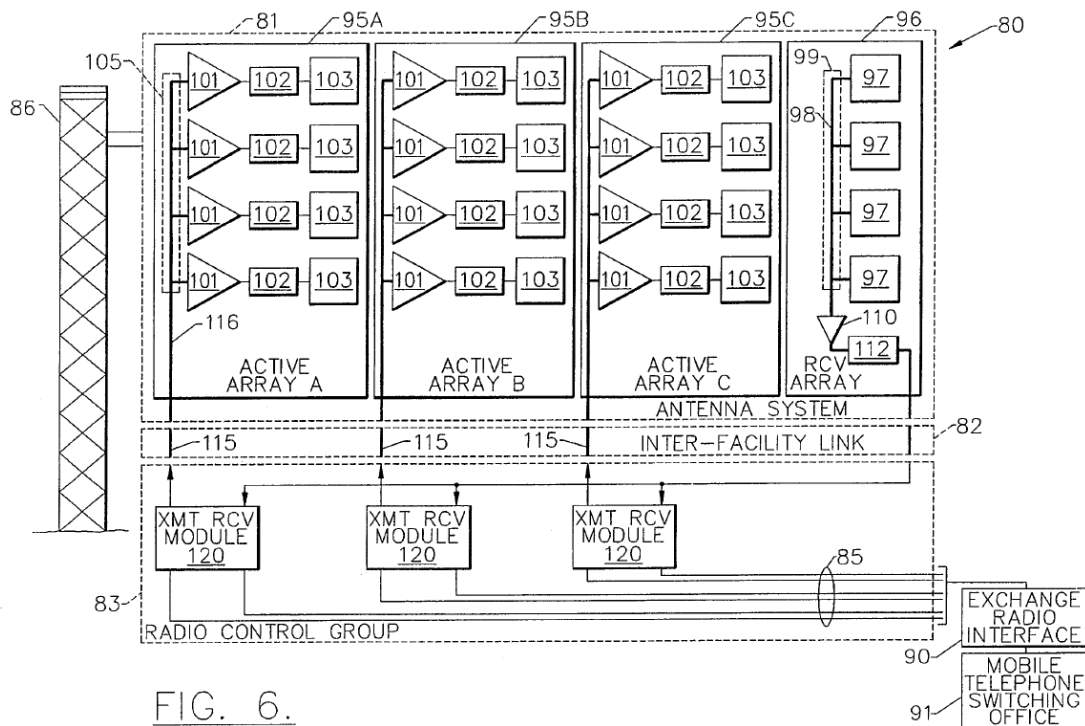


FIG. 6.

Figure 6 of Charas, above, illustrates base station 80, including antenna system 81 and radio control group 83. *Id.* at 7:46–59. Radio control group 83 comprises transmit/receive modules 120, which convert an information signal to a radio frequency (RF) output and vice versa for a receive signal. *Id.* at 10:12–17. The modulated RF carrier is transmitted to active array panel 95A where it is radiated. *Id.* at 10:38–41.

2. Discussion of Dependent Claims 4, 20, and 35

We turn to Petitioner’s contentions that dependent claims 4, 20, and 35 are unpatentable as obvious over Chang, Antonio, and Charas. Each of

claims 4, 20, and 35 depends from claim 1, 17, or 33, respectively, and each of claims 4 and 20 recites

wherein configuring said first device to determine information from at least one uplink transmission receivable from said second device through said smart antenna further includes:

configuring said first device to be capable of receiving at least one uplink transmittable message through said smart antenna;

configuring said first device to actively probe said second device by outputting a signal suitable for causing said smart antenna to transmit at least one downlink transmittable message over at least said different beam; and

configuring said first device to gather signal parameter information from said least one uplink transmittable message.

Ex. 1001, 11:26–40, 13:59–14:5. These limitations are commensurately recited in claim 35. Ex. 1001, 16:1–10.

Petitioner points to the combined teachings of Chang, Antonio, and Charas and provides the testimony of Dr. Winters as support. Pet. 57–67, 71, 72–74 (citing *e.g.*, Ex. 1006, 12:18–23, 13:30–32, 13:46–48, 15:26–32; Ex. 1007, 4:45–5:23, 10:27–43, Figs. 6, 9; Ex. 1003 ¶¶ 180–230, 247–250, 255–260). Additionally, relying on the testimony of Dr. Winters, Petitioner has articulated reasoning with rational underpinning to support the conclusion that one having ordinary skill would have had reason to combine the teachings in the manner advanced by Petitioner. *Id.*

We agree with Petitioner’s contentions and we credit and give significant weight to Dr. Winters’s testimony because we find both consistent with the evidence of record. For example, consistent with Petitioner’s contentions and the testimony of Dr. Winters, as discussed *supra*

in Sections II.D.3 and II.D.6 with respect to independent claim 1 and dependent claims 7, 23, and 28, Antonio discloses the user terminal measuring beam strength for each beam identifier received in a list (BMM) from the gateway and transmitting a PSMM to the gateway, and details regarding the gateway switching to the new active beam set including performing comparisons using a dual threshold scheme. Furthermore, Antonio describes “the handoff process begins with the gateway periodically (e.g., every 60 seconds) sending a BMM/PAM to the user terminal” and “[u]pon receiving a BMM the user terminal periodically (e.g., every 10 seconds) sends a PSMM to the gateway.” *Id.* at 13:44–48.

Also consistent with Petitioner’s contentions and the testimony of Dr. Winters that Charas’s technique uses a transmit/receive module to cause the phase array antennas to transmit RF signals to the mobile units (*see, e.g.*, Pet. 57–67; Ex. 1003 ¶¶ 180–230), Charas teaches

[t]he information signal is coupled to a modulator 121 where the phase, amplitude and/or phase and amplitude information are impressed upon a reference frequency to create a baseband signal coupled to a mixer 123 where it is mixed with a predetermined RF carrier frequency generated by a reference oscillator 127 and channel synthesizer 128. The reference oscillator 127 is also coupled to the modulator 121 via the multiplier 129 in the illustrated embodiment. The RF carrier frequency is selected responsive to commands which are obtained from the ERI. The output of the mixer 123 is coupled to a transmit filter 124 to remove unwanted mixer products. After filtering, the modulated RF carrier is coupled via coaxial cable 115 illustratively defining the IFL 82 to the transmission line 116 on the active array panel 95A where it is radiated as described above (FIG. 6). An identical process, at a separate carrier frequency, occurs in each of the other TRMs.

Ex. 1007, 10:27–43. Additionally, we are persuaded by Petitioner’s contentions and credit and give significant weight to Dr. Winters’s testimony that a person having ordinary skill in the art would have been motivated to consult Charas to provide details regarding transmission by the adaptive antenna array (Pet. 58–60; Ex. 1003 ¶¶ 182–186) because we find Petitioner’s contentions and Dr. Winters’s testimony consistent with the evidence of record, including the aforementioned detailed description in Charas, as well as Figures 6 and 9 of Charas. Ex. 1007, 10:27–43, Figs. 6, 9.

Patent Owner does not argue these claims separately. *See generally* PO Resp. Based on the record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 4, 20, and 35 are unpatentable, under 35 U.S.C. § 103(a), over Chang, Antonio, and Charas.

3. *Discussion of Dependent Claims 5, 21, and 36*

We turn to Petitioner’s contentions that dependent claims 5, 21, and 36 are unpatentable, under 35 U.S.C. § 103(a), as obvious over Chang, Antonio, and Charas. Each of claims 5, 21, and 36 depends from claim 4, 20, or 35, respectively, and each of claims 5 and 21 further recites

wherein configuring said first device to determine information from at least one uplink transmission receivable from said second device through said smart antenna further includes:

configuring said first device to be capable of receiving a plurality of uplink transmittable messages through said smart antenna;

configuring said first device to actively probe said second device by outputting a signal suitable for causing said smart antenna to transmit at least one downlink transmittable

message separately over each of a group of beams comprising said beam and said different beam; and configuring said first device to gather signal parameter information from each of said plurality of uplink transmittable messages.

Ex. 1001, 11:41–56, 14:6–22. These limitations are commensurately recited in claim 36. Ex. 1001, 16:11–21.

Petitioner’s showing refers to its contentions for dependent claims 4, 20, and 35, from which each of claims 5, 21, and 35 depends, respectively. Pet. 67–70 (citing *e.g.*, Ex. 1003 ¶¶ 231–246). Regarding the requirements that the first device is configured to receive a *plurality* of uplink transmittal messages, rather than at least one message, and smart antenna transmission is over a group of beams comprising *said beam* and said different beam (Ex. 1001, 11:41–56, 14:6–22, 16:11–21), Petitioner relies on Dr. Winters’s testimony that Antonio’s disclosure of transmitting messages periodically teaches receiving a plurality of messages and one having ordinary skill in the art would have understood from the combined teachings of Chang and Antonio that transmission over the beam and a different beam occurs when the mobile unit moves. *See, e.g.*, Ex. 1003 ¶¶ 235, 236, 241, 242.

We agree with Petitioner’s contentions and we credit and give significant weight to the testimony of Dr. Winters because we find both consistent with the evidence of record, including the asserted art. For instance, regarding transmitting messages periodically, Antonio describes “the gateway periodically (*e.g.*, every 60 seconds)” sends a “BMM/PAM to the user terminal” and “[u]pon receiving a BMM the user terminal periodically (*e.g.*, every 10 seconds) sends a PSMM to the gateway.” Ex. 1006, 13:46–48. Regarding transmitting over the beam and a different

beam, Antonio describes “[t]he PSMM transmitted from the user terminal to the gateway contains one or more beam identifiers from BMM 600.”

Ex. 10:16–18; *see also id.* at 13:3–21 (describing that “the beam handoff is a ‘soft’ beam handoff” such that “the gateway will not break the connections in the current active beam set until it receives confirmation from the user terminal that the user terminal is successful receiving information on the beam(s) in the new active beam set” and describing handoff with respect to beam sets including an “add beam set” that “contains a beam identifier for each beam within the new active beam set”).

Patent Owner does not argue these claims separately. *See generally* PO Resp. Based on the record before us, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 5, 21, and 36 are unpatentable, under 35 U.S.C. § 103(a), over Chang, Antonio, and Charas.

G. Patent Owner’s Contingent Motion to Amend

We have concluded that the challenged claims of the ’296 Patent are unpatentable. Therefore, we address Patent Owner’s contingent Motion to Amend to enter proposed substitute claims 49–65. Mot. to Amend 1.¹¹ For the reasons that follow, Patent Owner’s motion 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.

¹¹ Petitioner filed an Opposition to Patent Owner’s Motion to Amend (Paper 28, “MTA Oppn.”); Patent Owner filed a Reply to Petitioner’s Opposition to the Motion to Amend (Paper 33, “MTA Reply”); and Petitioner filed a Sur-Reply to the Reply to the Opposition to the Motion to Amend (Paper 40, “MTA Sur-Reply”).

§ 316(d) and 37 C.F.R. § 42.121. *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 (PTAB Feb. 25, 2019) (precedential). That is, 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. See 35 U.S.C. § 316(d); 37 C.F.R. § 42.121; see also *Lectrosonics, Inc.*, slip op. at 4–8.

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 *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 Patent Owner’s Motion to Amend does not satisfy the requirements of 37 C.F.R. § 42.121(b)(1) because it does not set forth written description support for any proposed substitute independent claim. We also determine that Petitioner has established by a preponderance of the evidence that the proposed substitute claims would have been obvious.

1. *Proposed Substitute Claims*

Proposed substitute claims 49, 55, and 61 are set forth below, with additions shown in underlining.

49. (Substitute for claim 1, if found unpatentable) A method for use in a wireless communication system compliant with IEEE 802.11 standards, the method comprising:

configuring a first device compliant with IEEE 802.11 standards having an adaptive smart antenna to selectively allow a second device compliant with IEEE 802.11 standards to operatively associate with a beam downlink transmittable to said second device using said adaptive smart antenna;

configuring said first device to determine information from at least one uplink transmission receivable from said second device through said adaptive smart antenna, wherein said information comprises at least one of a distance parameter or an angular parameter;

configuring said first device to determine if said associated second device should operatively associate with a different beam downlink transmittable using said adaptive smart antenna based on said determined information, such that the first device is configured to consider interfering signals in the determination; and

if said associated second device should operatively associate with a different beam, then configuring said first device to allow said second device to operatively associate with said different beam by at least one of configuring said first device to identify that said second device is allowed to operatively associate with said different beam, or configuring said first device to identify that said second device is not

allowed to operatively associate with said beam.

Mot. to Amend i.

55. (Substitute for claim 17, if found unpatentable) A computer-readable medium having computer executable instructions for causing logic to perform acts comprising:

- configuring a first device compliant with IEEE 802.11 standards having an adaptive smart antenna to selectively allow a second device compliant with 802.11 standards to operatively associate with a beam downlink transmittable to said second device using said adaptive smart antenna;
- configuring said first device to determine information from at least one uplink transmission receivable from said second device through said adaptive smart antenna, wherein said information comprises at least one of a distance parameter or an angular parameter;
- configuring said first device to determine if said associated second device should operatively associate with a different beam downlink transmittable using said adaptive smart antenna based on said determined information; and
- if said associated second device should operatively associate with a different beam, then configuring said first device to allow said second device to operatively associate with said different beam by at least one of configuring said first device to identify that said second device is allowed to operatively associate with said different beam, or configuring said first device to identify that said second device is not allowed to operatively associate with said beam.

Id. at iv–v.

61. (Substitute for claim 33, if found unpatentable) An apparatus for use in a wireless communication system compliant with 802.11 standards, the apparatus comprising:

at least one adaptive smart antenna;

at least one transceiver operatively coupled to said adaptive smart antenna and configured to send and receive electromagnetic signals using said adaptive smart antenna; and

logic operatively coupled to said transceiver and configured to selectively allow a second device compliant with 802.11 standards to operatively associate with a beam downlink transmittable to said second device using said adaptive smart antenna, determine information from at least one uplink transmission receivable from said second device through said adaptive smart antenna wherein said information comprises at least one of a distance parameter or an angular parameter, determine if said associated second device should operatively associate with a different beam downlink transmittable using said adaptive smart antenna based on said determined information, and if said associated second device should operatively associate with a different beam then allow said second device to operatively associate with said different beam and selectively identify that said second device is not allowed to operatively associate with said beam.

Id. at vii–viii.

2. Discussion—Written Description

An amendment may not enlarge the scope of the claims of the patent or introduce new matter. 35 U.S.C. § 316(d)(3). In connection with its

motion to amend, a patent owner 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). We first address whether Patent Owner’s Motion to Amend sets forth how the original application provides written description support for the amended claims. 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 the 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).

As an initial matter, Patent Owner relies on the ’296 Patent Specification, rather than any application, in its assertion that written description support is provided for the recitations in the proposed substitute claims. Mot. to Amend 4–19. Petitioner asserts Patent Owner’s Motion to Amend should be denied because “the Motion does not cite to the originally filed application (Ex. 1002, pp. 1–45), but rather only cites to the specification of the issued ’296 Patent.” MTA Oppn. 2 (citing Mot. to Amend 4–19). Patent Owner responds that “[t]he patent’s specification is identical to the original application, and was not amended in any way during prosecution” so Patent Owner satisfied § 42.121(b). MTA Reply 2. Petitioner, however, notes that Patent Owner relies on “attorney argument” and “presents no evidence” to support that the ’296 Patent Specification is identical to the original application. MTA Sur-Reply 1.

“A motion to amend claims” must “set forth” “[t]he support in the original disclosure of the patent for each claim that is added or amended.” 37 C.F.R. § 42.121(b) (2017). “Importantly, to meet this requirement, citation should be made to the original disclosure of the application, as filed, rather than to the patent as issued.” *Lectrosonics, Inc.*, slip op. at 8. Based on the record before us, we agree with Petitioner that Patent Owner has not set forth the written description support in the original disclosure of the patent for the proposed substitute claims. *See generally* Mot. to Amend. We need not make a further determination regarding Patent Owner’s citation to the patent as issued because even after consideration of the ’296 Patent Specification, we determine that the disclosure does not provide written description support for the proposed substitute claims, based on the record before us.

We turn to “a wireless communication system *compliant with 802.11 standards*” recited in the preambles of proposed substitute claims 49 and 61. Mot. to Amend i, vii (emphasis added). We first consider whether the preambles are limiting in view of the principles below.

“Generally,” we have said, “the preamble does not limit the claims.” *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002). Nonetheless, the preamble may be construed as limiting “if it recites essential structure or steps, or if it is ‘necessary to give life, meaning, and vitality’ to the claim.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002), quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999). A preamble is not regarded as limiting, however, “when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention.” *Catalina*, 289 F.3d at 809.

Am. Medical Sys., Inc. v. Biolitec, Inc., 618 F.3d 1354, 1358–59 (Fed. Cir. 2010). Each of proposed substitute claims 49 and 61 recites an “adaptive smart antenna.” Mot. to Amend i, vii. With respect to the proposed substitute independent claims and responding to a ground of unpatentability in the trial (37 C.F.R. 42.121(a)(2)(i)), Patent Owner asserts “[n]one of the references in this proceeding teach the proposed limitations specifying that a first device compliant with IEEE 802.11 standards has an adaptive smart antenna.” Mot. to Amend 21. In its contentions regarding written description, Patent Owner also takes the position that the preambles of proposed substitute claims 49 and 61 are limiting. *Id.* at 5, 10–11; MTA Reply 3–5. Petitioner does not dispute that the preambles are limiting. *See generally* MTA Oppn. Patent Owner’s contentions are consistent with the recitation of “wireless communication system compliant with IEEE 802.11 standards” being necessary to give meaning to the recitation of “adaptive smart antenna” recited in those claims, as understood in light of the ’296 Patent Specification. For instance, the summary of the invention of the ’296 Patent Specification describes that “[m]ethods and apparatus are provided which allow a wireless communication system using a smart antenna(s) to selectively cause a receiving device to switch its operative association from one transmitted beam to another available transmitted beam.” Ex. 1001, 2:54–58. Furthermore, the ’296 Patent Specification generally describes the invention with respect to a wireless communication system. *See generally* Ex. 1001. We, therefore, determine that the preambles of proposed substitute claims 49 and 61 are limiting.

Next we consider whether Patent Owner set forth written description support for its proposed amendment. Relying on the testimony of Dr. Short,

Patent Owner identifies three portions of the '296 Patent Specification that Patent Owner asserts provide written description support. Mot. to Amend 5, 10 (citing Ex. 1001, 4:39–47, 6:14–16, 8:34–37; Ex. 2004 ¶¶ 27–29, 48–50).

Of the identified portions, the only portion of the '296 Patent Specification that refers to “compliant” and “802.11” is below, as well as the immediately subsequent description.

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*.

Ex. 1001, 8:34–39 (emphasis added). Regarding the aforementioned portion, Dr. Short testifies that “[t]he specification also teaches that a benefit of the disclosed invention 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.’” Ex. 2004 ¶ 29 (citing Ex. 1001, 8:34–37).

Importantly, however, consistent with Dr. Winters’s testimony (Ex. 1025 ¶ 31 (cited at MTA Oppn. 4)), that portion of the '296 Patent Specification describes that the systems are not “IEEE 802.11 family compliant” because certain access points “need to be altered or modified.” Ex. 1001, 8:34–39. Dr. Winters further testifies that “POSITA would have understood that the specification requires modifying the access point in a way that makes it noncompliant with 802.11 standards.” Ex. 1025 ¶ 32; *cf.* Ex. 1029, 141:22–142:2 (testifying “he’s contemplating making changes to the 802.11 system so they could lose some compliance at the access point”).

Patent Owner asserts that the aforementioned description “refers to a ***particular embodiment***,” which “cannot negate other teachings as to other embodiments.” MTA Reply 6. Patent Owner, however, identifies only three portions of the ’296 Patent Specification that Patent Owner asserts provide written description support for the proposed amendment of “802.11 standards” in the proposed substitute claims and the aforementioned portion is one of those three portions. Mot. to Amend 5–6, 10–11 (citing Ex. 1001, 4:39–47, 6:14–16, 8:34–37). Notably, it is the only portion of the three that refers to “compliant” and “802.11.” Ex. 1001, 4:39–47, 6:14–16, 8:34–37. We discuss below deficiencies in the “other teachings as to other embodiments” (MTA Reply 6) and the other two portions relied upon by Patent Owner (Ex. 1001, 4:39–47, 6:14–16 (cited at Mot. to Amend 5–6, 10–11)).

We now turn to another of the portions of the ’296 Patent Specification that Patent Owner asserts provide written description support, which is set forth below.

The exemplary methods and apparatuses are adaptable to various protocols and/or standards. For demonstrative purposes and not by way of limitation, the examples presented herein are directed towards wireless IEEE 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, 4:39–47 (cited at Ex. 2004 ¶ 28).

Relying on the testimony of Dr. Winters, Petitioner asserts that “IEEE 802.11 type network configurations” (Ex. 1001, 4:39–47) includes wireless communications systems that are not compliant with IEEE 802.11 standards. MTA Oppn. 3 (citing, *e.g.*, Ex. 1025 ¶¶ 29–30). Dr. Winters testifies that

“[m]any wireless communication systems have such a configuration but are not compliant with IEEE 802.11,” including “the original WaveLAN system,” “HIPERLAN,” and proprietary 802.11 network configurations. Ex. 1025 ¶ 30 (citing, *e.g.*, Ex. 1035, 5:27–46; Ex. 1036, 1:21–49, 2:62–3:2; Ex. 1037, 1:10–46; Ex. 1038, 2; Ex. 1039, 3:5). We credit and give significant weight to Dr. Winters’s testimony because it is consistent with the evidence cited therein.

Patent Owner asserts that “[c]ompliant with IEEE 802.11 means that you comply with the mandatory aspects of the standard, not the optional ones.” Tr. 42:10–12; *see also* MTA Reply 9 (asserting that a device is considered 802.11 compliant if it adheres to the IEEE’s technological requirements in the 802.11 standard, but the device need not implement an optional portion of the standard). Patent Owner does not dispute that “IEEE 802.11 type network configurations” (Ex. 1001, 4:39–47) includes wireless communications systems that are not compliant with IEEE 802.11 standards. Tr. 42:15–43:13. Patent Owner contends, however, that because the ’296 Patent Specification refers to “wireless IEEE 802.11 type network configurations” (Ex. 1001, 4:39–47), “the ’296 patent teaches ‘a wireless communication system compliant with IEEE 802.11 standards.’” MTA Reply 4 (citing, *e.g.*, Ex. 2004, 8:34–37; Ex. 2010, 31:19–32:5).

One shows that one is “in possession” of the invention by describing the invention, with all its claimed limitations, not that which makes it obvious. *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997); *In re Wertheim*, 541 F.2d 257, 262 (CCPA 1976). That the IEEE 802.11 standards were known is not sufficient for establishing written description.

Patent Owner also asserts that Dr. Winters's deposition testimony establishes that the '296 Patent Specification's reference to "wireless IEEE 802.11 type network configurations" (Ex. 1001, 4:39–47) independently provides written description support. MTA Reply 5 (citing Ex. 2010, 31:19–32:5). Dr. Winters testifies that "there are many different categories that fall into an 802.11-type network" including a communication network that would be compliant (Ex. 2010, 31:19–32:5), but with respect to the understanding of a person having ordinary skill in the art, Dr. Winters testifies that "having a type of 802.11 configuration does not disclose a wireless communication system compliant with 802.11 standards." *Id.* at 31:10–18; *see also* Ex. 1025 ¶ 30 ("It is my opinion that a POSITA reading the '296 specification at 4:41–53 would have understood that having a 'type' of 802.11 network configurations does not disclose that 'a wireless communication system compliant with IEEE 802.11 standards.'"). We find Dr. Winters's deposition testimony (Ex. 2010, 31:19–32:5) to be consistent with his declaration testimony, for example, the testimony discussed above regarding "[m]any wireless communication systems" having such a configuration that are not compliant and further Dr. Winters's declaration testimony that he "do[es] not find that the disclosure of 'IEEE 802.11 **type** network configurations,' (Ex. 1001, 4:41–43) supports the proposed amendments." Ex. 1025 ¶ 30.

We credit and give significant weight to Dr. Winters's declaration testimony that the aforementioned portion of the '296 Patent Specification including "IEEE 802.11 type network configurations" (Ex. 1001, 4:39–47) does not provide written description support for "a wireless communication system compliant with IEEE 802.11 standards" (Ex. 1025 ¶¶ 29–30) over

the testimony of Dr. Short (*see, e.g.*, Ex. 2004 ¶¶ 27–29, 48–50) because we find Dr. Winters’s testimony consistent with the evidence of record. For instance, Dr. Winters’s testimony is consistent with the ’296 Patent Specification describing that in its systems, certain access points need to be altered or modified. Ex. 1001, 8:34–39. Importantly, neither Patent Owner nor Dr. Short identifies a portion of the ’296 Patent Specification describing 802.11 compliant access points or systems. Additionally, that the ’296 Patent describes IEEE 802.11 type network configurations does not resolve those deficiencies because the evidence of record demonstrates that certain wireless communication systems having 802.11 type network configurations were not compliant with IEEE 802.11, including WaveLAN, HIPERLAN, and proprietary 802.11 network configurations. *See, e.g.*, Ex. 1035, 5:27–46; Ex. 1036, 1:21–49, 2:62–3:2; Ex. 1037, 1:10–46, Ex. 1038, 2; Ex. 1039, 3:5.

The remaining portion of the ’296 Patent Specification that Patent Owner asserts provides written description support is “[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.” Ex. 1001, 6:14–16 (emphasis added). Communication logic 118 is illustrated in client device 104. *Id.* at Fig. 1; *see also id.* at 6:7–8 (describing “client device 104 includes communication logic 118, a transceiver 120 and an antenna 122”).

This remaining portion suffers from the same deficiency as the first portion in that it refers to only the client device. *Id.* at 6:14–16. We credit and give significant weight to Dr. Winters’s testimony (Ex. 1025 ¶¶ 29–34)

over that of Dr. Short (*see, e.g.*, Ex. 2004 ¶¶ 27–29, 48–50) that the reference to establishing a communication link does not resolve this deficiency for the same reasons discussed above with respect IEEE 802.11 type configurations as well as Dr. Winters’s testimony regarding non-compliant devices establishing communication links (Ex. 1025 ¶ 34 (citing, *e.g.*, Ex. 1038 § 15.4.7.1)).

In the Reply, Patent Owner also asserts “[t]he patent’s Background is directed to devices using ‘the IEEE 802.11 family of protocols/standards.’” MTA Reply 5 (citing Ex. 1001, 2:9–11). Patent Owner, however, acknowledges, “[t]he Background identifies certain problems with those systems, and proposes certain improvements.” *Id.* (citing Ex. 1001, 2:11–46). The ’296 Patent describes the problems with the “currently implemented” process when used “for wireless communication systems that use smart antennas” (Ex. 1001, 2:11–46) and, therefore, “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” (*Id.* at 2:47–50). In other words, consistent with the first portion discussed above (*Id.* at 8:34–39), the Background in the ’296 Patent Specification indicates that the system and, in particular, the antenna needs to be altered or modified. We, therefore, determine that the Background in the ’296 Patent Specification does not remedy the aforementioned deficiencies.

We now turn to “a first device *compliant with IEEE 802.11 standards*” recited in proposed substitute claims 49 and 55. Mot. to Amend i, iv (emphasis added). Patent Owner and Dr. Short identify the same portions of the ’296 Patent Specification discussed above as providing

written description support for this limitation. Mot. to Amend 6–7 (citing Ex. 1001, 4:41–53, 8:34–37); Ex. 2004 ¶ 35 (citing Ex. 1001, 4:41–53, 8:34–37). The “first device” corresponds to “an access point” (Motion to Amend 6; Ex. 1001, 2:62–64) and each of claims 49 and 55 recite “a first device . . . having an adaptive smart antenna” (Mot. to Amend i, iv). As discussed above, only one portion of the ’296 Patent Specification refers to “compliant” and “802.11,” but that discussion is limited to *client* devices and describes that “access point 102 and possibly access point 108 need to be altered or modified.” Ex. 1001, 8:34–39. For the same reasons given above with respect to “a wireless communication system compliant with 802.11 standards” recited in proposed substitute claims 49 and 61, we credit and give significant weight to Dr. Winters’s testimony (Ex. 1025 ¶¶ 29–38) over that of Dr. Short (*see, e.g.*, Ex. 2004 ¶¶ 27–29, 35, 48–50) that the ’296 Patent Specification does not provide written description support for the proposed amendments.

Although *ipsis verbis* support for claim terms is not necessary, it is incumbent upon the Patent Owner to set forth where the original disclosure provides written description support for the new limitations in the substitute claims. Patent Owner has not done so with respect to “a first device *compliant with IEEE 802.11 standards*” recited in proposed substitute claims 49 and 55 and “a wireless communication system *compliant with 802.11 standards*” recited in proposed substitute claims 49 and 61. Mot. to Amend i–viii (emphases added).

Accordingly, we determine that Patent Owner’s Motion to Amend does not set forth that the original disclosure provides written description support for “a first device *compliant with IEEE 802.11 standards*” recited in

proposed substitute claims 49 and 55 and “a wireless communication system *compliant with 802.11 standards*” recited in proposed substitute claims 49 and 61 (Mot. to Amend i–viii (emphases added)). 35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(b)(1). We, therefore determine that the original disclosure lacks written description support for proposed substitute independent claims 49, 55, and 61.

Each of proposed substitute dependent claims 50–54, 56–60, and 62–65 depend, directly or indirectly, from one of proposed substitute independent claims 49, 55, and 61. Upon consideration of the record before us, Patent Owner does not remedy the aforementioned deficiencies in its discussion of proposed substitute dependent claims 50–54, 56–60, and 62–65. We, therefore, also determine the original disclosure lacks written description support for proposed substitute dependent claims 50–54, 56–60, and 62–65.

3. Discussion—Obviousness

As a separate, independent reason, we also determine based on a preponderance of the evidence that the proposed substitute claims are unpatentable under 35 U.S.C. § 103(a) as obvious over the asserted prior art. As discussed *supra* in Sections II.D through II.F, Petitioner has shown by a preponderance of the evidence that the original claims are obvious over the asserted prior art combinations set forth in the Petition.

Relying on the testimony of Dr. Winters, Petitioner asserts that proposed substitute independent claims 49, 55, and 61 and proposed substitute dependent claims 53, 54, 59, 60, 64, and 65 would have been obvious over the combined teachings of Chang, Antonio, and Patel. MTA

Oppn. 11–21, 24–25 (citing *e.g.*, Ex. 1020, 1:23, 1:45–47, 3:1–4, 6:1–8; Ex. 1025 ¶¶ 49–69, 79–83). Additionally, relying on the testimony of Dr. Winters, Petitioner has articulated reasoning with rational underpinning to support the conclusion that one having ordinary skill would have had reason to combine the teachings in the manner advanced by Petitioner. *Id.*

We are persuaded by Petitioner’s contentions and credit and give significant weight to the testimony of Dr. Winters over the testimony of Dr. Short because we find Petitioner’s contentions and Dr. Winters’s testimony to be consistent with the evidence of record, and not undermined by Patent Owner’s arguments or evidence. We start with Patent Owner’s amendments requiring that the “smart antenna” be “adaptive.” *See generally* Mot. to Amend. Consistent with Petitioner’s contentions and the testimony of Dr. Winters, Chang discloses an “adaptive array antenna.” Ex. 1005, 5:6–7.

Turning to Patent Owner’s amendments relating to compliance with IEEE 802.11 standards (*see generally* Mot. to Amend), consistent with Petitioner’s contentions and the testimony of Dr. Winters, Patel discloses

[i]n the wireless network 10, each wireless router 30 provides a radio frequency (RF) link for mobile devices 44 within a corresponding cell 40. The wireless RF link to the mobile devices 44 in the cell 40 may be based on established technologies, or standards such as IS-54 (TDMA), IS-95 (CDMA), GSM and AMPS, 802.11 based WLAN, or new

upcoming technologies such as CDMA2000 and W-CDMA or proprietary radio interfaces.

Ex. 1020, 6:1–8.¹²

Patent Owner asserts that Petitioner’s assertions are conclusory and Petitioner, for example, does not explain sufficiently how Chang’s “beam spots” function under 802.11. MTA Reply 11. The parties do not dispute that the IEEE 802.11 standards recited in the claims were prior art to the ’296 Patent and Patel clearly refers to those standards. *Id.*; Tr. 65:4–66:2. Also, for the reasons discussed above and below regarding the similarity of the technologies that Chang and Patel use, we are persuaded by Petitioner’s contentions and do not find them conclusory, particularly in light of Chang’s detailed discussion of beam spot function. *See* Ex. 1005, 5:18–27, 6:1–11, Figs. 3–4. We also are persuaded by Petitioner’s response that Chang’s beam spots would improve an IEEE 802.11 communication system in the same way they improve Chang’s CDMA communication system, since both IEEE 802.11 and CDMA use the same direct sequence spread spectrum communication technique. MTA Sur-Reply (citing, *e.g.*, Ex. 1038, 5; Ex. 1025 ¶ 57). Consistent with Petitioner’s response, the 1997 IEEE 802.11 standard “defines the protocol and compatible interconnection of data communication equipment.” Ex. 1038, 5.

¹² Patent Owner asserts that “802.11 compliant” is tied “to the specific 802.11 standards *that were in existence at that point in time*,” i.e., the effective filing date of the ’296 Patent. Tr. 65:4–25. The evidence of record and Patent Owner’s assertion are consistent that the 802.11 standards recited in the proposed substitute claims are prior art to the ’296 Patent. *See, e.g.*, Ex. 1020, 6:3–8; Ex. 1038, 1–5; Ex. 1022.

We turn to Petitioner’s reasoning to combine the assert art because one having ordinary skill in the art would have been motivated to provide the beneficial results of IEEE 802.11 standards in Chang’s system, as modified by Antonio. MTA Oppn. 14–16. Patent Owner also asserts that Petitioner does not consider the combination of Chang and Antonio. MTA Reply 11. We, however, are persuaded by Petitioner’s showing and we credit and give significant weight to Dr. Winters’s testimony that one having ordinary skill in the art would have had reason to combine the teachings of Chang, Antonio, and Patel for the reasons given with respect to the original claims discussed in Section II.D and for the additional reasons Petitioner provides that the skilled artisan would have had to implement IEEE 802.11 standard compliant systems, i.e., high throughput, high data reliability, power savings, and to allow for interoperability. Ex. 1025 ¶¶ 53–57; Ex. 1022, 4. Consistent with Dr. Winters’s testimony (Ex. 1025 ¶¶ 53–57), IEEE 802.11 is described as delivering high throughput, highly reliable data delivery, and power savings. Ex. 1022, 5. IEEE 802.11 also is described as providing “multivendor interoperability.” *Id.* at 4.

Also, consistent with Dr. Winters’s testimony (Ex. 1025 ¶¶ 53–57), Chang and Patel both teach the system may be implemented in accordance with multiple, similar standards. Ex. 1005, 4:64–66 (describing that “[t]he present invention can be implemented in code division multiple access (CDMA) cellular communication system, time division multiple access (TDMA) system, or a frequency division multiple access (FDMA) system”); Ex. 1020, 6:5–8 (describing basing the mobile to cell link “on established technologies, or standards such as IS-54 (TDMA), IS-95 (CDMA), GMS and AMPS, 802.11 based WLAN, or new upcoming technologies such as

CDMA2000 and W-CDMA or proprietary radio interfaces”). Additionally, Chang teaches that “various modifications and variations can be made” and that “the specification and examples” are “exemplary only.” Ex. 1005, 7:64–8:1; *see also* Ex. 1006, 5:56–58 (“The present invention could find use in a variety of wireless information and communication systems.”).

Patent Owner further asserts that Petitioner relies on an incorrect characterization of Dr. Short’s testimony. MTA Reply 11. We, however, determine that Petitioner has made its showing without relying on the testimony of Dr. Short and, further, that Dr. Short’s testimony does not undermine Petitioner’s showing.

We turn to Petitioner’s contentions regarding amendments relating to information comprising “at least one of a distance parameter or an angular parameter” and “configured to consider interfering signals in the determination.” MTA Oppn. 16–21. Relying on the testimony of Dr. Winters, Petitioner provides well supported contentions showing where the subject matter recited in these amendments is found in the asserted prior art. *Id.* (citing, *e.g.*, Ex. 1025 ¶¶ 60–69). Also, the amendments do not distinguish over the asserted prior art as is evident from the contentions presented in the Petition and referred to again in Petitioner’s Opposition. For example, as discussed with respect to the original claims, Chang describes determining signal strength information and estimating the direction and location of the mobile unit, each of which teaches information comprising a “distance parameter.”

Regarding “configured to consider interfering signals in the determination,” we agree with Petitioner’s contentions and credit and give significant weight to Dr. Winters’s testimony (MTA Oppn. 18–21; MTA

Sur-Reply 11–12; Ex. 1025 ¶¶ 66–69) because we find Petitioner’s contentions and Dr. Winters’s testimony consistent with the evidence of record. For example, both Chang and Antonio consider interference. Ex. 1005, 3:27–40 (describing that the present invention can cover a high traffic area inside of the cell while introducing less interference than the current method), 5:51–55 (describing reconfiguring beam spots); Ex. 1006, 9:35–43 (describing adjusting for load balancing), 12:39–43 (describing considering the presence of specular reflection); Ex. 2010, 47:5–6 (testifying that mobile unit densities are indicative of interfering signals).

We find that Patent Owner’s contentions disputing Petitioner’s reliance on teachings relating to density of mobile unit signals and load do not undermine Petitioner’s showing. MTA Reply 11–13. To the extent that Patent Owner’s argument seeks to require that the prior art use the exact terminology as the claim language, an obviousness analysis is not an *ipsissimis verbis* test. *Cf. In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). Indeed, in an obviousness analysis, as here, we must consider the combination of references, as a whole, in light of the general knowledge of an ordinarily skilled artisan. *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986); *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1361 n.3 (Fed. Cir. 2008) (“What a prior art reference discloses or teaches is determined from the perspective of one of ordinary skill in the art.”).

Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that proposed substitute independent claims 49, 55, and 61 and proposed substitute dependent claims 53, 54, 59, 60, 64, and 65 would have been obvious over the combined teachings of Chang, Antonio, and Patel.

In addition, relying on the testimony of Dr. Winters, Petitioner asserts that proposed substitute claims 50 and 56 would have been obvious over the combined teachings of Chang, Antonio, Patel, and Campbell. MTA Oppn. 21 (citing, *e.g.*, Ex. 1025 ¶ 70). Patent Owner does not argue claims 50 and 56 separately. Proposed substitute claims 50 and 56 vary from the original claims only in their dependence on proposed substitute independent claims. For the reasons given with respect to the independent proposed substitute claims and original claims 2 and 18, which correspond to proposed substitute claims 50 and 56, we are persuaded by Petitioner's contentions and credit and give significant weight to the testimony of Dr. Winters because we find Petitioner's contentions and Dr. Winters's testimony to be consistent with the evidence of record. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that proposed substitute claims 50 and 56 would have been obvious over the combined teachings of Chang, Antonio, Patel, and Campbell.

Moreover, relying on the testimony of Dr. Winters, Petitioner asserts that proposed substitute claims 51, 52, 57, 58, 62, and 63 would have been obvious over the combined teachings of Chang, Antonio, Patel, Charas, and Schiff. MTA Oppn. 21–24 (citing, *e.g.*, Ex. 1021, 13:37–40, 13:42–45; Ex. 1025 ¶¶ 72–78). Additionally, relying on the testimony of Dr. Winters, Petitioner has articulated reasoning with rational underpinning to support the conclusion that one having ordinary skill would have had reason to combine the teachings in the manner advanced by Petitioner. *Id.* In particular, we determine that Petitioner's contentions and Dr. Winters's testimony are consistent with Antonio's description of measuring the amount of energy in

the pilot signals, as well as Antonio's specific reference to Schiff. Ex. 1006, 9:12–29; Ex. 1021, (21); Ex. 1025 ¶ 73.

Regarding amendments relating to “null-data frame,” we are persuaded by Petitioner's contentions and credit and give significant weight to the testimony of Dr. Winters because we find Petitioner's contentions and Dr. Winters's testimony to be consistent with the evidence of record. In particular, consistent with Petitioner's contentions and the testimony of Dr. Winters, Schiff describes

[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) into transmit modulator 526. That is, the orthogonal function, Walsh code, used to form the channel for 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. This effectively results in transmitting only the PN spreading codes applied from PN generator 532.

Ex. 1021, 13:37–45. Additionally, amendments relating to transmission of a downlink message do not distinguish over Antonio's messages discussed in the Petition, as well as in Petitioner's Opposition. MTA Oppn. 23–24.

Patent Owner does not argue claims 51, 52, 57, 58, 62, and 63 separately. Based on our review of the parties' arguments and evidence, Petitioner has shown by a preponderance of the evidence that the proposed substitute claims 51, 52, 57, 58, 62, and 63 would have been obvious over the asserted art.

4. *Conclusion—Motion to Amend*

Based on the evidence in the entire trial record, we determine that Patent Owner's Motion to Amend does not establish that the original

application provides written description support for proposed substitute claims 49–65. Additionally, Petitioner has shown by a preponderance of the evidence that the proposed substitute claims would have been obvious over the asserted art. Accordingly, Patent Owner’s Motion to Amend is *denied*.

H. Petitioner’s Motion to Strike

Petitioner filed a Motion to Strike (Paper 35, “Mot. to Strike”); Patent Owner filed an Opposition to Petitioner’s Motion to Strike (Paper 39, “MTS Oppn.”); and Petitioner filed a Reply in support of its Motion to Strike (Paper 42, “MTS Reply”). In its Motion to Strike, Petitioner asserts “Patent Owner’s Sur-Reply (Paper 32) at pages 8–14 contains arguments regarding a ‘separate control channel’ in Chang” that “were waived when Patent Owner failed to raise them in its Response.” Mot. to Strike 1. Petitioner asserts that Patent Owner asserts the arguments were presented in Patent Owner’s Response by way of conclusory, brief assertions that cite to paragraphs 34 through 79 of Dr. Short’s Declaration. *Id.* at 2–3.

The briefs filed by the parties must set forth a detailed explanation of the evidence. 37 C.F.R. §§ 42.22, 42.23; *see also* Paper 11, 5 (“Patent Owner is cautioned that any arguments for patentability not raised in the response may be deemed waived.”). We agree with Petitioner that such explanation for the relevant issue is lacking in Patent Owner’s Response. However, for the reasons given above, even after consideration of the testimony, we are persuaded by Petitioner’s showing and find it is not undermined by Dr. Short’s testimony.

Under the particular circumstances in this case, as discussed above, even without striking portions of Patent Owner’s Sur-Reply, we have

determined that Petitioner has demonstrated by a preponderance of the evidence that the challenged claims are unpatentable and we have denied Patent Owner's Motion to Amend. Accordingly, we deny Petitioner's Motion to Strike.

I. Petitioner's Motion for Observations

Petitioner filed a Motion for Observation (Paper 36, "Pet. Mot. Obs."). Petitioner's Motion for Observation asserts the relevance of certain portions of Dr. Winters's deposition testimony. As set forth above, we have made our determinations regarding the original claims based on Petitioner's arguments and evidence, even after consideration of the arguments and evidence in Patent Owner's Sur-Reply.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has established by a preponderance of the evidence that the challenged claims of the '296 Patent are unpatentable based on the following grounds:

References	Basis	Claims	Claims Shown Unpatentable	Claims Not Shown Unpatentable
Chang and Antonio	§ 103	1, 6, 7, 17, 22, 23, 33, 37, and 38	1, 6, 7, 17, 22, 23, 33, 37, and 38	
Chang, Antonio, and Campbell	§ 103	2 and 18	2 and 18	

References	Basis	Claims	Claims Shown Unpatentable	Claims Not Shown Unpatentable
Chang, Antonio, and Charas	§ 103	4, 5, 20, 21, 35, and 36	4, 5, 20, 21, 35, and 36	

In summary with regard the Motion to Amend, we determine

Motion to Amend Outcome	Claims
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	49–65
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	49–65
Substitute Claims: Not Reached	

Finally, we deny Petitioner’s Motion to Strike.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 2, 4–7, 17, 18, 20–23, 33, and 35–38 of the '296 Patent have been proven to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied*;

FURTHER ORDERED that Petitioner's Motion to Strike 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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