

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARUBA NETWORKS, INC.,
Petitioner,

v.

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

Case IPR2018-00725
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 Petitioner's Motion to Exclude
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Aruba Networks, 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.”). Additionally, Petitioner filed a Reply to Patent Owner’s Preliminary Response (Paper 12, “Pet. POPR Reply”) and Patent Owner filed a Sur-Reply (Paper 13).¹ Upon consideration of the parties’ contentions and supporting evidence, we instituted an *inter partes* review pursuant to 35 U.S.C. § 314, as to all challenged claims and with respect to all grounds set forth in the Petition. Paper 14 (“Inst. Dec.”).

After institution, Patent Owner filed a Patent Owner Response (Paper 22, “PO Resp.”); Petitioner filed a Reply (Paper 30, “Pet. Reply”); and Patent Owner filed a second Sur-Reply (Paper 31, “PO Sur-Reply”). A transcript of the hearing held on June 18, 2019, has been entered into the record. Paper 41 (“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.

¹ The parties were authorized to file the supplemental briefing and evidence. Paper 10.

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. 4; Paper 4, 1–3; Paper 19, 3–4.

The parties further state the '296 Patent is the subject of other petitions for *inter partes* review in Case No. IPR2018-00764 and Case No. IPR2018-01017, which are pending. Paper 19, 3.

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, omni-directional antennas. *Id.* at 2:25–31.

Figure 1 of the '296 Patent is reproduced below.

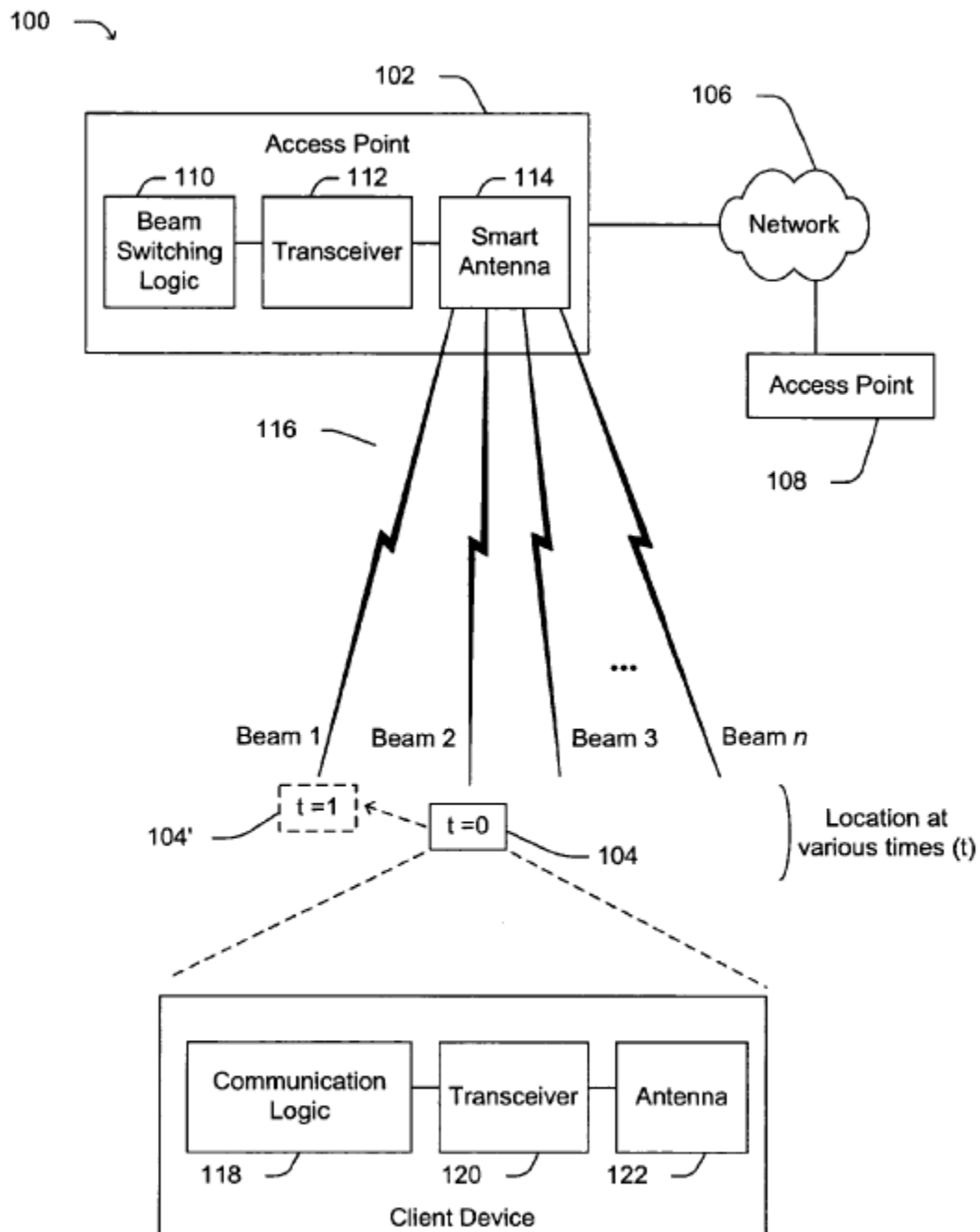


Fig. 1

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, access point 102 includes beam switching logic 110, smart antenna 114, and transceiver 112, which is coupled to switching logic 110 and smart antenna 114. *Id.* at 5:3–6, Fig. 1. Smart antenna 114 transmits main beams 116 in correspondence with transmit signals output by transceiver 112 and receives signals transmitted by client 104. *Id.* at 5:6–16.

Access point 102 is configured to cause receiving client 104 to switch between main beams 116. *Id.* at 4:61–65. In particular, beam switching logic 110 detects the location of client 104. *Id.* at 5:47–49. When beam switching logic 110 determines that client 104 is associated with the “wrong beam,” beam switching logic 110 causes client 104 to re-associate with another one of main beams 116 by altering the operation of transceiver 112. *Id.* at 5:55–60.

C. Illustrative Claim

Petitioner challenges claims 1, 2, 4–7, 17, 18, 20–23, 33, and 35–38 of the ’296 Patent. Pet. 6. 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 Ground of Unpatentability

Petitioner asserts that the challenged claims are unpatentable, under 35 U.S.C. § 103(a),² as obvious over Hovers³ and Jetzek.⁴ Pet. 6. The earliest priority date claimed for the '296 Patent is November 4, 2002. Ex. 1001, (60). Hovers was filed April 16, 2002, and issued on March 18, 2008. Ex. 1003, (22), (45). Jetzek was published on June 29, 2000. Ex. 1004, (43). Thus, Hovers and Jetzek qualify as prior art to the '296 Patent.

² 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.

³ U.S. Patent No. 7,346,365 B1 (Ex. 1003, “Hovers”).

⁴ International Patent Publication No. WO 00/38455 A1 (Ex. 1004, “Jezek”).

As support for its challenge, Petitioner submits a Declaration of Anthony Acampora, Ph.D., who has been retained by Petitioner for the instant proceeding. Ex. 1012 ¶ 1. Petitioner also submits a Reply Declaration of Dr. Acampora. Ex. 1017.

Patent Owner submits a Declaration of Robert Short, Ph.D., who has been retained by Patent Owner for the instant proceeding. Ex. 2002 ¶ 1. Patent Owner also submits a second Declaration of Dr. Short. Ex. 2003.

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.⁵ 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).

⁵ The record does not include evidence of secondary considerations of nonobviousness.

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). Relying on the testimony of Dr. Acampora, Petitioner provides contentions regarding the level of ordinary skill in the art. Pet. 12 (citing Ex. 1012 ¶ 72). Dr. Acampora testifies

a person of ordinary skill in the art at the time of the alleged invention of the '296 patent would have had either a Bachelor's degree in electrical engineering with at least three to four years of experience in the field of wireless communications, or a Master's degree in electrical engineering with at least two years of experience in the field of wireless communications.

Ex. 1012 ¶ 72. Patent Owner does not dispute Petitioner's proffered level of ordinary skill or propose an alternative. *See generally* PO Resp.; Tr. 6:4–5, 8:3–5.

On the record before us, we are persuaded to adopt Dr. Acampora'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 find that the prior art of 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) (recognizing that “the prior art itself [may] reflect[] an appropriate level” of ordinary skill in the art).

C. *Claim Construction*

In this *inter partes* review, we construe claim terms 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).⁶ Neither party provides an express construction for any claim term. Pet. 6–7; *see generally* PO Resp; Tr. 6:4–5, 8:3–5. We determine that no claim terms need to be construed expressly 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’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. *Obviousness over Hovers and Jetzek*

Petitioner contends each of claims 1, 2, 4–7, 17, 18, 20–23, 33, and 35–38 is unpatentable, under 35 U.S.C. § 103(a), as obvious over Hovers and Jetzek. Pet. 12–61. 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.

⁶ The claim construction standard to be employed in an *inter partes* review recently 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, 2018) (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).

1. Overview of Hovers

Hovers is directed to using a smart antenna in a wireless communications system. Ex. 1003, 1:5–7. Figure 1 of Hovers is reproduced below.

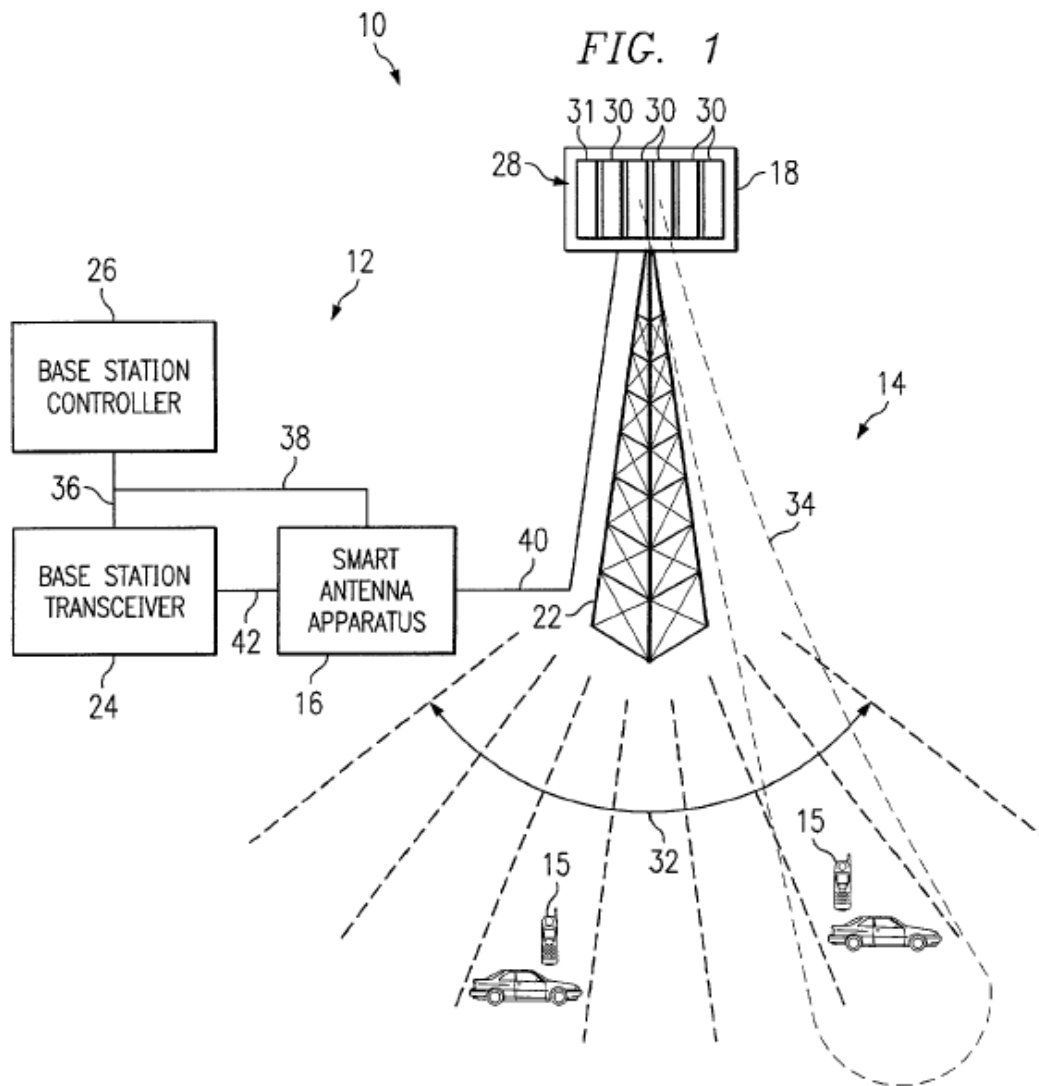


Figure 1 of Hovers illustrates wireless communication system 10 including smart antenna system 14, base station system 12, and mobile station 15. *Id.* at 5:49–52. Smart antenna system 14 includes antenna unit

18 and smart antenna apparatus 16, which is coupled to base station system 12. *Id.* at 5:64–67. Antenna unit 18 includes smart antenna array 28 having antenna elements 30 and sector antenna 31. *Id.* at 6:29–31. Antenna unit 18 is located on antenna tower 22 so that signals to and from antenna unit 18 are unobstructed. *Id.* at 6:35–40. Smart antenna system 14 forms narrow beams 34. *Id.* at 6:46–50.

Smart antenna system 14 transmits and receives signals from mobile stations 15 via one or more of narrow beams 34. *Id.* at 7:53–61. In particular, smart antenna apparatus 16 within smart antenna system 14 processes signals to select the best of narrow beams 34 and to allow uplink signals received via that narrow beam 34 to be communicated to base station transceiver 24 via radio signal wires 42. *Id.* at 7:17–24. When downlink signals are to be transmitted from base station system 12 to mobile station 15, the downlink signals are communicated from base station transceiver 24 to smart antenna apparatus 16 to select the best one of narrow beams 34 through which to send the downlink signals. *Id.* at 7:39–44.

2. Overview of Jetzek

Jetzek is directed to handing over a connection from one channel or base station to another in radio communications systems. Ex. 1004, 1:5–7. According to Jetzek, transferring a connection without overlap in time between transmissions is referred to as a “hard” handoff. *Id.* at 2:1–3. Jetzek describes the mobile station making measurements and if network evaluated handoff (NEHO) is employed, the mobile station reports the measurements to the system, which performs an evaluation using a handoff algorithm. *Id.* at 13:22–14:3. Jetzek describes, alternatively, if mobile

evaluated handover (MEHO) is employed, the mobile station itself performs the evaluation. *Id.* at 14:3–5.

3. *Discussion of Claim 1*

We begin our analysis with independent claim 1. Petitioner asserts that the combination of Hovers and Jetzek renders claim 1 obvious. Pet. 6, 20–37. 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. Acampora’s testimony for support. *Id.* (citing, *e.g.*, Ex. 1012 ¶¶ 61–65, 74, 75–78, 80–92).

Patent Owner counters that Petitioner fails to present reasoning to modify Hovers in view of Jetzek. *See generally* PO Resp. Patent Owner does not dispute that the combined teachings of Hovers and Jetzek teach or suggest all limitations of claim 1. *Id.*; *see also* Tr. 6:2–3 (Petitioner asserting that “[i]t’s undisputed that all of the claim elements are taught by this combination,” and Patent Owner not arguing otherwise).

Upon review of the arguments and evidence in the record, we find that Petitioner has shown how the combined teachings of Hovers and Jetzek 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 points

to Hovers's disclosure of "a **method** and apparatus for beam selection in a smart antenna apparatus" and its use in "**wireless communication system 10.**" Pet. 2–3, 14–16, 23–24 (citing, *e.g.*, Ex. 1003, 1:10–20, 1:45–49, 5:49–51).⁷ For the first recitation in claim 1, referred to by Petitioner as limitation "1[a]" (Pet. 25), 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), Petitioner points to Hovers's teachings relating to wireless communication system 10, described with respect to Figure 1, and cites to Dr. Acampora's testimony as support. Pet. 2–3, 14–16, 25–26 (citing, *e.g.*, Ex. 1003, 4:47–55, 5:49–6:40, 12:47–60, Fig. 1; Ex. 1012 ¶¶ 22–28, 33, 48–57, 78). For instance, Petitioner asserts that Hovers includes (1) a first device, i.e., base station system 12 coupled to smart antenna system 14; and (2) a second device, i.e., one or more mobile stations 15. *Id.* at 25 (citing Ex. 1003, 5:49–6:40, Fig. 1). Petitioner also asserts that Hovers discloses smart antenna system 14 executing one or more algorithms to select an uplink beam and a downlink beam, which are used to communicate from and to one of the mobile stations, respectively. *Id.* at 25–26 (citing Ex. 1003, 4:47–55, 5:49–6:40, 12:47–60, Fig. 1).

Consistent with Petitioner's assertions, Figure 1 of Hovers illustrates base station system 12 coupled to smart antenna system 14. *See, e.g.*, Ex. 1003, 5:49–51, 5:61–67, Fig. 1. Hovers's smart antenna system 14 includes antenna unit 18 and smart antenna apparatus 16, described in more

⁷ For purposes of this Decision, we assume, without deciding, that the preamble is limiting.

detail with respect to Figures 1 and 2. *Id.* at 5:64–67, Figs. 1, 2. Hovers also discloses that base station system 12 includes one or more base station transceivers 24 and base station controller 26, and one of base station transceivers 24 communicates radio signals to and from one or more of mobile stations 15 via antenna unit 18. *Id.* at 5:61–6:6, Fig. 1.

Also consistent with Petitioner’s assertions, Hovers describes

[t]he smart antenna apparatus is operable to execute *one or more algorithms*, based on a number of inputs, to select an uplink beam for uplink signals and a downlink beam for downlink signals. The uplink beam is used to communicate uplink signals received from a mobile station to a base station transceiver. The downlink beam is used to communicate downlink signals from the base station transceiver to the mobile station.

Id. at 4:47–55 (emphasis added); *see also id.* at 12:47–60 (describing assigning downlink signals to one of narrow beams 34). We, therefore, determine that Petitioner’s arguments and evidence demonstrate that Hovers teaches the preamble and limitation 1[a].

We now turn to the remaining recitations in claim 1, referred to by Petitioner as limitations “1[b],” “1[c],” and “1[d],” respectively (Pet. 26, 28, 33–34), which are reproduced below.

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*;

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 (emphases added).

For limitations 1[b] and 1[c], Petitioner points to Hovers’s teachings relating to selecting the best one of narrow beams 34 for transmission and cites to Dr. Acampora’s testimony as support. Pet. 2–3, 14–16, 27–30 (citing, *e.g.*, Ex. 1003, 7:8–10, 7:16–22, 7:22–29, 7:39–8:5; Ex. 1012 ¶¶ 22–28, 33, 48–57, 81–85). In particular, Petitioner contends that Hovers’s first device (i.e., the base station) receives and determines information (i.e., parameters) from at least one uplink transmission from the second device (i.e., the mobile device). *Id.* at 27 (citing, *e.g.*, Ex. 1003, 7:8–10, 7:17–22, 7:26–29). Regarding selection, Petitioner contends Hovers’s “smart antenna system also selects the ‘**best narrow beam 34 through which to send the downlink signals**’ to the mobile device based on the same similar parameters.” *Id.* at 29 (citing *e.g.*, 7:39–51, 12:57–63).

Consistent with Petitioner’s contentions, Hovers describes uplink selection as follows:

Smart antenna apparatus 16 *processes uplink signals received along each narrow beam 34 and/or other input signals or data to select the best narrow beam 34 and allow uplink signals received via that narrow beam 34 to be communicated to base station transceiver 24 via radio signal wires 42.* For example, smart antenna apparatus 16 may select the best narrow beam 34 based on one or more inputs or parameters. One input may include *signaling information* received by signaling information monitoring system 106 (described below in connection with FIG. 2). Other example inputs or parameters

include *signal strength, signal quality, relevant power, and signal history of signals received from one or more mobile stations 15.*

Ex. 1003, 7:17–29 (emphases added). Regarding the downlink selection, also consistent with Petitioner’s contentions, Hovers discloses that “[s]mart antenna apparatus 16 may select a best narrow beam 34 through which to send the downlink signals.” *Id.* at 7:42–44. Hovers also discloses that “[l]ike the beam selection for uplink signals discussed above, the beam selection for the downlink signals may be based on one or more inputs or parameters, including *signaling information received by signaling information monitoring system 106*” and “*signal strength, signal quality, and signal history of signals received from one or more mobile stations 15.*” *Id.* at 7:44–51 (emphases added).

For “determined information” recited in limitations 1[b] and 1[c], Petitioner also points to Jetzek’s teaching of the mobile reporting measurements to the base station, in combination with Hovers’s teachings above. *See, e.g.*, Pet. 27–28, 30–33 (citing, *e.g.*, Ex. 1012 ¶¶ 61–65, 81–89). Dr. Acampora testifies that “[i]n Jetzek’s handoff process,” in particular in NEHO, the mobile device reports its channel measurements to the base station and “[a] person skilled in the art would have appreciated that in such a case, the base station ‘determines information’ from the uplink transmission as claimed, and that the mobile’s report of its channel measurements is the determined information.” Ex. 1012 ¶ 82; *see also id.* ¶ 89 (testifying “[a] person skilled in the art would have had reason to implement a hard handoff algorithm such as taught by Jetzek to determine if the mobile device should operatively associate with a different beam downlink transmitted by the smart antenna of Hovers based on the

determined relative signal strength or quality parameters” (emphasis added)).

Regarding limitations 1[b] and 1[c], consistent with Petitioner’s contentions and Dr. Acampora’s testimony, Jetzek teaches that “[p]referable quantities for the measurement of the quality level are for example the downlink signal-to-interference ratio, downlink received signal strength, downlink pathloss or downlink pathloss plus uplink interference” and “[c]ombinations of different quantities can be used.” Ex. 1004, 9:11–14; *see also id.* at 16:20–21 (describing comparing quality of a measured cell with a threshold). Also consistent with Petitioner’s contentions and Dr. Acampora’s testimony, Jetzek describes that in NEHO mode, after “the mobile station has made the requested measurements,” “*the mobile station will report the measurements to the system which will then evaluate the various sectors using a handoff algorithm.*” *Id.* at 13:22–14:4 (emphasis added). The parties’ contentions and evidence relating to reasoning to combine these teachings of Jetzek with Hovers’s system will be discussed further below.

For limitation 1[d], Petitioner again points to Hovers’s teachings relating to beam selection and switching from one narrow beam to another narrow beam. *See, e.g.*, Pet. 34–35 (citing, *e.g.*, Ex. 1003, 1:34–41, 1:45–46, 7:52–58; Ex. 1012 ¶ 90). Petitioner also points to Jetzek’s teachings relating to hard handoff and provides reasoning to combine the teachings, relying on the testimony of Dr. Acampora for support. *Id.* at 35–37 (citing, *e.g.*, Ex. 1004, 2:1–14, 3:14–19, 8:8–18, 15:20–16:4, Fig. 7; Ex. 1012 ¶¶ 90–92). Dr. Acampora testifies that one having ordinary skill in the art would have understood that limitation 1[d] is taught by implementing in Hovers’s

system Jetzek’s hard handoff such that “the mobile device is ‘allowed’ to communicate with a different beam and additionally ‘not allowed’ to communicate with its current beam.” Ex. 1012 ¶¶ 90–92 (citing, *e.g.*, Ex. 1003, 1:45–46, 7:52–58; Ex. 1004, 2:1–6, 3:5–13, 13:22–16:7, Figs. 3, 7).

Consistent with Petitioner’s contentions and Dr. Acampora’s testimony, Hovers describes that smart antenna apparatus 16 switches “from one narrow beam 34 to another narrow beam 34 for receiving uplink signals and/or transmitting downlink signals to mobile station 15.” Ex. 1003, 7:52–58. Also consistent with Petitioner’s contentions and Dr. Acampora’s testimony, Jetzek describes “hard” handoffs as “handoffs which are performed wherein there is no overlap in time between transmissions received from an original, serving base station and transmissions received from a new, target base station.” *Id.* at 2:1–6; *see also id.* at 15:20–16:4 (describing when “hard handover” is performed “all connections of the current active set will be removed and a new connection to sector X will be set up”). The parties’ contentions and evidence relating to reasoning to combine these teachings of Hovers and Jetzek will be discussed further below.

For the foregoing reasons, we determine that Petitioner’s arguments and evidence demonstrate that limitations 1[b], 1[c], and 1[d] are taught by the asserted art.

Accordingly, upon review of the evidence in the record, we find that Petitioner has shown how the combined teachings of Hovers and Jetzek teach or suggest each limitation of claim 1. Petitioner’s limitation-by-

limitation analysis is not disputed by Patent Owner. PO Resp.; *see also* Tr. 6:2–3.

b. Reasoning to Combine Hovers and Jetzek

Turning to the reason to combine Hovers and Jetzek, 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. Acampora, Petitioner asserts that one having ordinary skill in the art would have understood that Hovers and Jetzek describe similar systems and would have modified Hovers to incorporate Jetzek’s hard handoff algorithm to promote efficiency. Pet. 2–3, 14–22, 25–37 (citing, *e.g.*, Ex. 1003, 4:47–55; Ex. 1004, 3:14–4:2, 19:8–13, 20:1–4; Ex. 1012 ¶¶ 22–28, 33, 48–65, 78, 80–92). Petitioner characterizes the proposed combination as nothing more than an application of a known technique in a prior art system ready for the improvement and asserts that a person having ordinary skill in the art would have looked to the disclosures of Hovers and Jetzek together to solve problems associated with allowing mobile devices to switch between beams transmitted by a base station. *Id.* at 20–21, 32 (citing, *e.g.*, Ex. 1012 ¶ 74).

More specifically, Dr. Acampora testifies that a person having ordinary skill in the art would have had reason to use Jetzek’s handoff algorithm, for example, to conserve bandwidth and promote “efficient use of system resources.” Ex. 1012 ¶¶ 81–89 (citing, *e.g.*, Ex. 1004, 3:20–4:2, 19:8–13, 20:1–4). Dr. Acampora also testifies that Hovers and Jetzek “come from the same field of endeavor” and both describe systems in which the base station makes the handoff using quality measurements. *See, e.g.*, Ex.

1012 ¶ 74 (testifying that Hovers and Jetzek “come from the same field of endeavor, which is enabling wireless communications systems to more efficiently service client devices”), ¶ 86 (“[L]ike Hovers, Jetzek discloses a system in which the base station makes a handoff (that is, beam switching) determination”), ¶ 88 (testifying that “Jezek teaches that, like Hovers’ smart decision beam selection process, the handoff decision criteria is based on ‘the quality of a measured cell (base station, transmission source, beam, sector, etc.)’”). Dr. Acampora’s testimony is discussed in more detail below.

Relying on the testimony of Dr. Short, Patent Owner contends that (1) the Petition relies on Jetzek’s NEHO mode, but provides no motivation for the choice of Jetzek’s NEHO mode (PO Resp. 8–14 (citing, *e.g.*, Ex. 2002 ¶¶ 49–53, 65, 69–70; Ex. 2003 ¶ 47)); and (2) the Petition does not demonstrate how a person having ordinary skill in the art could have implemented its proposed modifications, or that a person having ordinary skill in the art would have had a reasonable expectation of success (*id.* at 14–28 (citing, *e.g.*, Ex. 2003 ¶¶ 48, 50–70)).

We start with Patent Owner’s first dispute. Patent Owner, more specifically, asserts that Petitioner “told the Board” that the Petition does not rely on Jetzek (or its NEHO mode). PO Resp. 8 (citing Pet. POPR Reply 1). Patent Owner asserts, however, Petitioner’s statement is false and that the Petition does indeed rely on Jetzek’s NEHO mode. *Id.* at 9–10 (citing Ex. 2004, 8:2–15, 10:2–15). In its Reply, Petitioner does not dispute that it “looks to Jetzek’s NEHO mode.” *See, e.g.*, Pet. Reply 1–5.

Therefore, the only remaining question regarding Patent Owner’s first dispute is whether the Petition provides reasoning for the choice of Jetzek’s

NEHO mode. We are persuaded by Petitioner’s showing and Dr. Acampora’s testimony, and Patent Owner’s arguments and evidence do not undermine that showing.

As an initial matter, Petitioner and Dr. Acampora clearly point out that Hovers teaches beam switching performed by the base station, so no modification is needed of Hovers’s system to perform beam switching in the network and, further therefore, Jetzek’s NEHO mode is pertinent. In particular, as discussed in the element-by-element analysis, which is unrebutted by Patent Owner, the Petition, relying on the testimony of Dr. Acampora, points to Hovers’s base station and smart antenna system for beam switching in recitations 1[b] and 1[c]. Pet. 2–3, 14–20, 25–30 (citing, *e.g.*, Ex. 1003, 7:8–10, 7:17–22, 7:26–29, 7:39–51, 12:57–63; Ex. 1012 ¶¶ 22–28, 33, 48–65, 78, 80–85). For instance, for recitation 1[b], Dr. Acampora testifies that “[t]he ‘first device’ (base station) in Hovers receives information from at least one uplink transmission receivable from the ‘second device’ (mobile device) through its smart antenna.” Ex. 1012 ¶ 81 (citing Ex. 1003, 7:8–10, 7:17–22, 7:26–28). For recitation 1[c], Dr. Acampora, for example, testifies “[t]he smart antenna system of Hovers (the ‘first device’) processes uplink signals from the mobile devices (‘second device’) ‘to select the best narrow beam 34’ with which to communicate with the mobile device.” Ex. 1012 ¶ 84 (citing Ex. 1003, 7:16–22, 7:22–29, 7:39–51, 12:57–63).

Dr. Short testifies regarding alleged shortcomings in Hovers’s unmodified system. Ex. 2002 ¶¶ 69–70. In particular, Dr. Short testifies that Hovers does not teach sending an active measurement command to its mobile devices or receiving downlink beam measurements from its mobile

devices. *Id.* ¶ 69. Dr. Short testifies that, as a result, “Hovers would need to be further modified to incorporate Jetzek’s NEHO mode.” *Id.* ¶ 70; *cf.* Ex. 2003 ¶ 47 (testifying Dr. Acampora relies on Jetzek’s NEHO algorithm for choosing beams). That Petitioner’s obviousness assertion is based on modifying Hovers to implement, for example, the mobile reporting measurements in Jetzek does not undermine that in Hovers’s unmodified system, beam switching already is performed by the base station, and, therefore, Jetzek’s NEHO mode is pertinent. Furthermore, contrary to Dr. Short’s testimony, no modification is needed to Hovers.

Importantly, we find Hovers’s and Jetzek’s teachings consistent with the contentions in the Petition and Dr. Acampora’s testimony. For example, Hovers teaches that the base station makes the determination whether the mobile station should operate through the use of a different beam for downlink transmissions. Hovers, more specifically, describes, “[t]he *smart antenna apparatus* is operable to execute one or more algorithms, based on a number of inputs, *to select an uplink beam for uplink signals and a downlink beam for downlink signals.*” *See, e.g.*, Ex. 1003, 4:47–55 (emphases added). Hovers provides further details regarding processing performed by its smart antenna system 14 to select the best of narrow beams. *Id.* at Ex. 1003, 7:17–24 (describing processing performed by smart antenna apparatus 16 included in smart antenna system 14), 7:39–44 (describing smart antenna apparatus 16 selecting beams based on one or more inputs or parameters, including signaling information, signal strength, signal quality, and signal history), 12:57–63 (describing that transmitting beam switch 125, transmitting beam selection 124, and processing system 102 within smart antenna apparatus 16 shown in Figure 2 select and assign the downlink signals). Because Hovers

itself teaches beam switching performed by the base station, one having ordinary skill in the art would not need to modify Hovers to incorporate that functionality. Additionally, we credit Dr. Acampora's testimony that like Hovers, Jetzek discloses a system in which the base station makes a beam switching determination, in particular in NEHO mode (Ex. 1012 ¶ 86), because, like Hovers, Jetzek describes the mobile station making measurements and, in NEHO mode, reporting the measurements to the system, which performs an evaluation using a handoff algorithm. Ex. 1004, at 13:22–14:3.

As another reason that Patent Owner's arguments and evidence do not undermine Petitioner's showing, neither Patent Owner nor Dr. Short considers the advantages and reasons stated in Hovers that a person having ordinary skill in the art would have known and considered in turning to Jetzek's pertinent NEHO mode. For example, Hovers itself describes that “[s]mart antenna apparatus 16 may switch from one narrow beam 34 to another narrow beam 34,” for example, “when mobile station 15 *moves to a new location*” so that in Hovers's system, the “*best beam*” is selected. Ex. 1004, 7:52–58, 7:61–8:5 (emphasis added) (cited at Pet. 22, 33 (discussing reasoning to combine)); see *SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1318–19 (Fed. Cir. 2015) (affirming the Board's obviousness determination that was based on the “[f]inding that the reason to combine was manifested by the references themselves”).

Accordingly, based on the record before us, upon consideration of Patent Owner's assertions and evidence (see, e.g., PO Resp. 8–14; PO Sur-Reply 18–21; Ex. 2002 ¶¶ 49–71; Ex. 2003 ¶¶ 46–48), we are persuaded by Petitioner's explanation and we credit Dr. Acampora's testimony over that

of Dr. Short that one having ordinary skill in the art modifying Hovers would refer to Jetzek's NEHO pertinent embodiment in which, like Hovers, the beam switching is performed by the base station. We find Petitioner's showing is not undermined by Patent Owner's arguments or evidence.

Furthermore, upon consideration of the contentions and evidence of both parties, we are persuaded by Petitioner's explanation that the Petition articulates reasoning for modifying Hovers in the manner proposed by Petitioner. In addition, we credit Dr. Acampora's testimony over that of Dr. Short because Dr. Acampora's testimony is consistent with the evidence of record. For instance, we credit Dr. Acampora's testimony that a person having ordinary skill in the art would have had reason to use Jetzek's handoff algorithm, for example, to conserve bandwidth and promote "efficient use of system resources." Ex. 1012 ¶¶ 80, 83, 89 (citing, *e.g.*, Ex. 1004, 3:20–4:2, 19:8–13, 20:1–4). Consistent with Dr. Acampora's testimony (*id.*), Jetzek teaches that "[a]n advantage of hard handoff, therefore, is a reduced need for system resources." Ex. 1004, 3:20–4:2; see also *id.* at 2:1–3 (describing that in a hard handoff, "there is no overlap in time between transmissions received from an original, serving base station and transmissions received from a new, target base station"). Jetzek further teaches that "[i]n rural areas, for example, line of sight links between mobile stations and base stations are rather frequent" so "even in case of hard handoff, a reliable handoff will be performed." *Id.* at 19:8–13. Also consistent with Dr. Acampora's testimony (Ex. 1012 ¶¶ 80, 83, 89), Jetzek teaches that "system capacity will most likely be increased by implementation of the present invention, since the present invention offers

the possibility to control soft and hard handoff whereby efficient use of system resources is promoted.” *Id.* at 20:1–4.

We further note that the ’296 Patent describes that it solves a problem with a mobile making switching determinations. Ex. 1001, 2:27–34 (describing that “the receiving device may not always be able to determine when it should switch”), 2:47–50 (describing that “there is a need for methods and apparatuses that will effectively cause a receiving device to switch beam association”). To the extent that Patent Owner’s alleged deficiency is because Petitioner’s reasoning to modify Hovers is not the same as the problem given in the ’296 Patent, as our reviewing court has held repeatedly, the reason “to modify a prior art reference to arrive at the claimed invention need not be the same motivation that the patentee had.” *Alcon Research Ltd. v. Apotex Inc.*, 687 F.3d 1362, 1368–69 (Fed. Cir. 2012). “The question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art.” *KSR*, 550 U.S. at 420. “In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls.” *Id.* at 419. Furthermore, in the instant case, Hovers, without any modifications, already teaches that beam switching is performed by the base station so Hovers does not have the problem with a mobile making switching determinations identified in the ’296 Patent (Ex. 1001, 2:27–34, 2:47–5).

Accordingly, regarding the first dispute, i.e., whether the Petition provides reasoning for the choice of Jetzek’s NEHO mode (PO Resp. 8–14 (citing, *e.g.*, Ex. 2002 ¶¶ 69–70; Ex. 2003 ¶ 47)), based on the record before us, we determine that Petitioner has offered articulated reasoning with a

rational underpinning as to why one of ordinary skill in the art would have modified and combined the teachings of the asserted art in the manner proposed by Petitioner. We further determine that Petitioner's showing is not undermined by Patent Owner's arguments or evidence.

We turn to the second dispute, i.e., whether the Petition demonstrates how a person having ordinary skill in the art could have implemented its proposed modifications, and that a person having ordinary skill in the art would have had a reasonable expectation of success (*id.* at 14–28 (citing, *e.g.*, Ex. 2003 ¶¶ 48, 50–70)). In addition to Petitioner's contentions regarding reasoning to combine discussed above, Petitioner sets forth what Petitioner proposes to modify in Hovers to arrive at the subject matter recited in claim 1, citing to the testimony of Dr. Acampora for support. Petitioner also provides detailed contentions and evidence supporting that one having ordinary skill in the art would have known how to implement the proposed modification and would have had a reasonable expectation of success. *See, e.g.*, Pet. 2–3, 14–33 (citing, *e.g.*, Ex. 1012 ¶¶ 22–28, 33, 48–65, 74, 78, 80–89).

We start with Petitioner's proposed modification of Hovers. Petitioner, more specifically, proposes modifying “Hovers to use the hard handoff algorithm disclosed by Jetzek as one of its ‘one or more algorithms.’” *E.g.*, Pet. 26 (citing, *e.g.*, Ex. 1003, 4:47–55; Ex. 1012 ¶ 80); *see also id.* at 30–31 (citing, *e.g.*, Ex. 1003, 27:64–67, 61:62–67, 42:27–31; Ex. 1012 ¶¶ 61–65, 86–89) (proposing “implement[ing] a hard handoff algorithm such as taught by Jetzek to determine if a mobile device should operatively associate with a different beam downlink transmitted by the smart antenna of Hovers based on the determined relative signal strength or

quality parameters”). As discussed above in the limitation-by-limitation analysis, Petitioner points to Jetzek’s “channel measurements” reported by the mobile device for “the determined information” recited in claim 1. *See, e.g., id.* at 27–28 (citing, *e.g.*, Ex. 1012 ¶¶ 82, 83; Ex. 1004, 9:11–14, 13:22–14:5).⁸

Dr. Acampora testifies

[i]n addition, Hovers states that its system “may determine whether to use the fast decision beam selection, the smart decision beam selection, or neither” for selecting the uplink and/or downlink beams, depending on the circumstances. Ex. 1003, 27:64–67; *see also* Ex. 1003, 41:62–67; 42:27–31. Thus, a person skilled in the art would have appreciated that other algorithms for selecting a different beam downlink could be implemented in Hovers.

Ex. 1012 ¶ 86.⁹

Petitioner’s contentions and Dr. Acampora’s testimony above are consistent with the evidence of record. For example, Hovers describes “[t]he smart antenna apparatus is operable to execute *one or more algorithms*” to select an uplink beam and a downlink beam. Ex. 1003, 4:47–49 (emphasis added); *see also id.* at 27:64–67 (describing using fast or smart decision “or neither depending on the circumstances”), 41:62–67 (describing

⁸ Petitioner also provides contentions and testimony of Dr. Acampora that Hovers alone satisfies at least certain limitations of claim 1. During the hearing, Petitioner indicated that obviousness over Hovers alone was not asserted in this proceeding. Tr. 8:6–9. Accordingly, we do not consider any ground of obviousness over Hovers alone.

⁹ We note that Dr. Acampora’s testimony that the skilled artisan would have appreciated that other algorithms “could be implemented in Hovers” (*id.*) pertains to reasonable expectation of success, for example, rather than reasoning to combine. We discuss Dr. Acampora’s testimony regarding reasoning to combine above.

using “fast decision beam selection module 408, smart decision beam selection module 410, or neither for selecting an appropriate one or more narrow beams 34”), 42:27–31 (describing using fast or smart beam selection “or neither”). Jetzek describes that “principles described above with respect to hard and soft handoff . . . can be directly mapped to other systems which employ sectorized and/or array antennas.” Ex. 1004, 3:14–19. We further note that Jetzek describes that its techniques “can be applied to handoffs from or to any transmission source, e.g., a cell, a base station, a sector, a beam, a transceiver, etc.” *Id.* at 12:21–24; *see also id.* at 12:25–13:2 (“[I]t will be appreciated by those skilled in the art that these techniques apply equally to any type of transmission source”).

Relying on the testimony of Dr. Short, Patent Owner contends “the Petition and Dr. Acampora’s declaration contain no showing that Jetzek’s ‘active measurement command’ could be implemented in a real world environment, such as a GSM [Global System for Mobile Communication] environment.” PO Resp. 18–23 (citing, *e.g.*, Ex. 2003 ¶¶ 48, 50–61). Patent Owner disputes Dr. Acampora’s testimony that the functionality already is in GSM and modifying Hovers in an environment without the functionality would have been a simple software add-on to processing system 102. *Id.* (citing, *e.g.*, Ex. 2004, 71:20–72:7, 96:2–97:21; Ex. 2003 ¶¶ 50–61).

Patent Owner’s asserted deficiency with implementing Petitioner’s proposed modification in a GSM environment pertains to “Jetzek’s ‘active measurement command.’” PO Resp. 18–23. For claim 1, Petitioner points to Jetzek’s “channel measurements” reported by the mobile device for “the determined information” recited in claim 1. *See, e.g.*, Pet. 27–28 (citing, *e.g.*, Ex. 1012 ¶¶ 82, 83; Ex. 1004, 9:11–14, 13:22–14:5). Petitioner

explains that in Jetzek, the mobile device reports its channel measurements in response to a “measurement command” (i.e., the “active measurement command”), but for teaching the limitations in claim 1, Petitioner does not rely on Jetzek’s “measurement command,” only Jetzek’s channel measurements. *Id.* Although a cited portion of Jetzek relied upon by Petitioner is the same for claim 1 and dependent claims 4, 5, 20, 21, 35, and 36, unlike claim 1, for those dependent claims, Petitioner does rely on Jetzek’s “measurement command” to teach “actively probe” recited in those dependent claims. *Id.* at 48 (citing 1004, 13:22–14:5). For those dependent claims, Petitioner also points to additional details, i.e., that Jetzek’s “measurement command contains ‘a list of channel numbers, codes or other channel identifying information’ identifying downlink beams to be measured by the mobile station.” *Id.*

Patent Owner contends that Petitioner “relies on Jetzek’s ‘active measurement command’ with respect to all challenged claims.” PO Sur-Reply 3 (citing Pet 22; Ex. 2004, 8:2–15). In the portion of the Petition relied upon by Patent Owner, however, Petitioner provides contentions for “the ‘actively probing’ limitations found in some of the challenged *dependent* claims.” Pet. 22 (emphasis added). On this record, therefore, we are not persuaded that Petitioner relies on Jetzek’s active “measurement command” for claim 1 and, for this reason alone, we find that Patent Owner’s contentions and evidence do not undermine Petitioner’s showing for claim 1. However, as a second, independent reason, even if Petitioner relies on Jetzek’s active “measurement command” for claim 1, for the reasons below, we are persuaded by Petitioner’s showing for claim 1 and

find that Patent Owner's contentions and evidence do not undermine Petitioner's showing.

We turn now to Petitioner's argument and evidence supporting that one having ordinary skill in the art would have known how to implement the proposed modification, i.e., implementing Jetzek's measurement commands and would have had a reasonable expectation of success because the functionality of sending measurement commands already is in the GSM standard (*see, e.g.*, Pet. 2–3, 14–33 (citing, *e.g.*, Ex. 1012 ¶¶ 22–28, 33, 48–65, 74, 78, 80–89)) and Patent Owner's dispute, i.e., that the functionality is not in the GSM standard (*see, e.g.*, PO Resp. 14–21 (citing, *e.g.*, Ex. 2003 ¶¶ 48, 50–55)). More specifically, Patent Owner, relying on the testimony of Dr. Short, asserts the GSM standard is deficient because no active measurement command is sent requesting that the mobile make measurements. PO Resp. 14–21 (citing Ex. 2003 ¶¶ 48–55). Dr. Short, for example, testifies that “GSM's MAHO [Mobile Assisted Handoff] approach makes use of *periodic* downlink beam measurement reports prepared by GSM mobile phones based on *automatic* measurements that are taken whenever the mobile phone is in an active cell with the network.” Ex. 2003 ¶ 54. Dr. Short also testifies the GSM standards lack “measurement commands” sent by base stations to mobile phones and mobile stations providing downlink beam measurements “*in response to* any such base station commands.” *Id.* ¶ 52 (emphasis added).

Relying on the testimony of Dr. Acampora, Petitioner contends Patent Owner's “argument is premised on a fundamental misunderstanding of GSM technology” and “Dr. Short failed to consider the relevant GSM specification documents.” Pet. Reply 2, 14–20 (citing, *e.g.*, Ex. 2004,

71:20–73:13, 96:2–97:21; Ex. 1017 ¶¶ 3–13); *see also* Pet. 2–3, 14–20, 25–33 (citing, *e.g.*, Ex. 1012 ¶¶ 22–28, 33, 48–65, 74, 78, 80–89). Specifically, in his Reply Declaration, Dr. Acampora testifies “by 2002, the GSM standard *did* provide for a capability by which GSM base stations could command GSM mobile stations (i.e., mobile phones) to make downlink measurements, and for the GSM mobile stations to then transmit those downlink measurements back to the GSM base station(s) in response to such measurement commands” and that “in the GSM standard, these measurement commands are known as ‘Measurement Orders.’”

Ex. 1017 ¶¶ 5–6. Dr. Acampora further testifies

The 3GPP TS 04.60 version 7.10.0 Release 1998, for example, is a GSM specification document (see Ex. 1018 at cover, 1 (“Keywords: GSM”)) and under the section “5.6 Measurement Reports,” describes how “[t]he network may request measurement reports from the MS” (mobile station). Ex. 1018 at 26. In particular, this section describes two separate ways in which the network can order the mobile station to perform measurements and report those measurement results to the network: “Network Control (NC) measurement reporting” (§ 5.6.1) and “Extended measurement (EM) reporting[”] (§ 5.6.2). Ex. 1018 at 26–28.

Ex. 1017 ¶ 7. Dr. Acampora additionally testifies regarding the details in the aforementioned GSM specification document of how in GSM, the network orders the mobile station to perform measurements and report the results of those measurements. *Id.* ¶¶ 8–9 (citing, *e.g.*, Ex. 1018, 39–42, 60, 62).

Dr. Acampora also testifies that “[o]ther GSM specification documents . . . similarly discuss these ‘Measurement Orders’ sent from a base station to a mobile station and the resulting ‘Measurement Reports’ returned from the base station to the mobile station,” and Dr. Acampora’s testimony identifies

those other standards, as well as pertinent description. *Id.* ¶¶ 10–12 (citing, *e.g.*, Ex. 1019, 39–40, 46–56; Ex. 1020, 1, 37–38, 44–47, 50–55).¹⁰

Dr. Acampora’s testimony above provides responsive detail to further support his testimony provided in his Declaration submitted in support of the Petition. In his Declaration submitted in support of the Petition, Dr. Acampora testifies that “Hovers’ system is useful, for example, in wireless communication systems such as cellular systems using the GSM, GPRS [Global Packet Radio Service], or CDMA [Code Division Multiple Access] standards.” Ex. 1012 ¶ 48 (citing, *e.g.*, Ex. 1003, 5:3–7, 5:54–60) (cited at Pet. 14). Dr. Acampora further testifies

[s]econd generation cellular systems (e.g., the GSM system) introduced the notion of Mobile Assisted Handoff (“mobile assisted handover” or “MAHO”). Here, a mobile in communication with a given base station also monitors the signal strength of surrounding base stations and sends these measurements back to the serving base station in the form of a report. The infrastructure then determines whether a handoff to a base station better able to serve the mobile should be executed. Accordingly, the signals sent from surrounding base stations are serving as active probes from which the infrastructure can determine the appropriate serving base station. See Hillebrand, Ex. 1011 at 316-317.

¹⁰ Dr. Acampora identifies evidence supporting his testimony (Ex. 1017 ¶¶ 3–13), including GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS, TECHNICAL SPECIFICATION ETSI TS 101 349 VER. 7.10.0 (2002) (Ex 1018); GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS, TECHNICAL SPECIFICATION ETSI TS 100 911 VER. 8.5.0 (2000) (Ex. 2019); and GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS, TECHNICAL SPECIFICATION ETSI TS 100 911 VER. 8.11.0 (2001) (Ex. 1020) (herein referred to collectively as “GSM Technical Specifications”).

Id. ¶ 33.¹¹

Consistent with Dr. Acampora’s testimony in support of the Petition (*id.* ¶ 48), Hovers describes

[i]n one embodiment, wireless communication system 10 operates in a GSM (Global System for Mobile Communications) environment. However, wireless communication system 10 may operate according to other wireless standards including, for example, CDMA (Code Division Multiple Access) standards such as IS-95A and IS-95B, CDMA2000, W-CDMA, TD SCDMA, TETRA, and TDMA (Time Division Multiple Access) standards such as IS-136 and IS-54, without departing from the scope of the present invention.

Ex. 1003, 5:52–60. Also consistent with Dr. Acampora’s testimony (*id.* ¶ 48), Hovers describes communication between base station system 12 and mobile stations 15 in a GSM environment. *See, e.g., id.* at 8:6–49. Hovers further describes operation of base station transceiver 24 and base station controller 26 (shown with base station 12 in Figure 1) “in a GSM or GPRS environment” and “in a 3G [third-generation] environment.” *See, e.g., id.* at 5:3–7, 6:15–24, Fig. 1.

Additionally, consistent with Dr. Acampora’s testimony, Hillebrand describes

GSM Mobile Stations (MS), which are not transmitting or receiving all the time, having the capability to (i) perform measurements of the “downlink” signals received from the serving as well as the neighbouring Base Transceiver Stations (BTS) and (ii) report these measurements regularly to the network. The handover decision algorithm, implemented in the

¹¹ Dr. Acampora identifies evidence supporting his testimony, including GSM AND UMTS THE CREATION OF GLOBAL MOBILE COMMUNICATION, 316–17 (Friedhelm Hillebrand ed., 2002) (Ex. 1011) (“Hillebrand”).

Base Station Controller (BSC), utilizes both “uplink” measurements performed by the BTS and “downlink” measurements reported by the MS. This technique referred to as “mobile assisted handover” which proved to be a very efficient and future proof feature of GSM.

Ex. 1011, 316. Furthermore, consistent with Dr. Acampora’s testimony in his Reply Declaration, the GSM Technical Specifications describe “Network control (NC) measurement reporting” and “Extended measurement (EM) reporting.” Ex. 1018, 26–28 (providing an overview of the reporting), 39–40, 60, 62 (describing sending measurement report), 41–42 (describing the network sending measurement orders), 107–114 (providing message content for orders and reports); Ex. 1019, 39–40 (describing “Extended measurement reporting” as including an “Extended Measurement Order (EMO)” and an “Extended Measurement Report,” the latter of which includes the “signal level measurements” by the mobile station), 46–56 (describing cell reselection and a mobile station monitoring and sending measurement reports when ordered); Ex. 1020, 1, 37–38 (describing that extended measurement reporting includes an EMO and a report of the “signal level measurements” by the mobile station), 44–47 (describing cell re-selection), 50–55 (describing a mobile station monitoring and sending measurement reports when ordered).

In its Sur-Reply, Patent Owner characterizes the aforementioned contentions and evidence in the Petition as “conclusory or vague assertions” and, with respect to the aforementioned arguments and evidence submitted in the Petitioner’s Reply, Patent Owner asserts that Petitioner cannot “rely on new theories and evidence presented for the first time *after* institution in order to make its *prima facie* case of obviousness.” PO Sur-Reply 1–2; *see also* PO Resp. 19 (asserting that “post-Petition testimony” should not be

considered). Patent Owner further asserts that “**showing how the combination of the two references was supposed to work is a ‘prerequisite’ to a prima facie demonstration of obviousness.**” *Id.* at 1. Patent Owner also asserts that Petitioner “relies on an *entirely new* declaration from Dr. Acampora with *entirely new evidence*” to make the showing for the first time in its Reply. *Id.* at 4.

However, as set forth above, in support of the Petition, Dr. Acampora testifies in his initial Declaration regarding the knowledge of one having ordinary skill in the art (Ex. 1012 ¶¶ 18–36), including the knowledge the skilled artisan would have had regarding GSM (*see, e.g., id.* at 33), and Dr. Acampora also testifies regarding the teachings of Hovers and Jetzek (*id.* ¶¶ 48–93).¹² The Petition and the evidence submitted therewith set forth the proposed modification i.e., “implement a hard handoff algorithm such as taught by Jetzek to determine if the mobile device should operatively associate with a different beam downlink transmitted by the smart antenna of Hovers based on the determined relative signal strength or quality parameters.” *See, e.g., id.* ¶ 89 (cited, *e.g., at* Pet. 89). The Petition and supporting evidence also show persuasively that such a person would have known how to make the proposed modification and would have had a reasonable expectation of success because, for example, such a procedure already existed in GSM (*id.* ¶ 33 (citing Ex. 1011, 316–317)) and Hovers

¹² This knowledge of one having ordinary skill in the art pertains to reasonable expectation of success. Petitioner relies on Jetzek, not GSM, for teaching that the mobile reports measurements to the base station. *See, e.g.,* Pet. 28, 30–32 (citing, *e.g.,* Ex. 1004, 9:11–14, 13:22–14:5). Patent Owner does not dispute Petitioner’s contentions that Jetzek teaches the mobile reporting its measurements to the base station. *See generally* PO Resp.

describes its system as implemented in GSM (*id.* ¶ 48 (citing, *e.g.*, Ex. 1003, 5:3–7, 5:54–60)).

Importantly, the knowledge of one having ordinary skill in the art, which Patent Owner characterizes as newly added in the Reply, was set forth in Dr. Acampora’s initial Declaration. For example, Dr. Acampora specifically testifies “[s]econd generation cellular systems (*e.g.*, the GSM system) introduced the notion of Mobile Assisted Handoff (‘mobile assisted handover’ or ‘MAHO’)” and “[h]ere, a mobile in communication with a given base station also monitors the signal strength of surrounding base stations and sends these measurements back to the serving base station in the form of a report.” *Id.* ¶ 33 (citing Ex. 1011, 316–17). Dr. Acampora also testifies “[t]he infrastructure then determines whether a handoff to a base station better able to serve the mobile should be executed.” *Id.* In accordance with 37 C.F.R. § 42.65(a) (2017),¹³ Dr. Acampora’s initial Declaration also provides supporting evidence, *i.e.*, Hillebrand (*id.* (citing Ex. 1011, 316–17)), and we find Dr. Acampora’s testimony is consistent with Hillebrand’s description of GSM mobile stations performing measurements of downlink signals and reporting these measurements to the network for use in the handover decision algorithm (Ex. 1011, 316). Indeed, Patent Owner questioned Dr. Acampora during his deposition regarding his Declaration, and consistent with his Declaration, Dr. Acampora testified that “the functionality is already in GSM.” *See, e.g.*, Ex. 2004, 96:2–97:21; *see also id.* at 71:18–73:13 (testifying the functionality is “built in” if “Hovers is

¹³ “Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.” 37 C.F.R. § 42.65(a).

a GSM system”), 30:6–32:18 (identifying paragraph 33 as relevant to his explanation and that a skilled artisan would understand Hovers in the context of GSM and its “MAHO process”).

Although the Petition and Dr. Acampora’s initial Declaration set forth the knowledge of the skilled artisan regarding GSM as it pertains to claim 1 (Pet. 2–3, 14–20, 25–33 (citing, *e.g.*, Ex. 1012 ¶¶ 22–28, 33, 48–65, 74, 78, 80–89)), and Dr. Acampora testified during his deposition regarding relevant GSM technology set forth in his Declaration (Ex. 2004, 71:18–73:13, 96:2–97:21), Patent Owner, relying on the testimony of Dr. Short, asserts in Patent Owner’s Response that GSM’s MAHO approach is deficient based on Dr. Short’s knowledge of GSM and certain GSM specifications. PO Resp. 14–21; Ex. 2003 ¶¶ 48–55 (citing Exs. 2005–2009). Dr. Acampora’s testimony directly responds to that contention and testimony. *See generally* Ex. 1017. Such responsive evidence is not improper. *See* 37 C.F.R. § 42.23(b). Additionally, Dr. Acampora’s responsive testimony discloses the underlying facts and data supporting that testimony, specifically the portions of GSM specifications describing reporting measurements in GSM that are relied on by Petitioner as evidence the skilled artisan would have had a reasonable expectation of success in implementing Jetzek’s teachings. Ex. 1017 ¶¶ 3–12 (citing, *e.g.*, Ex. 1018, 26–28, 39–42, 60, 62, 107–114; Ex. 1019, 39–40, 46–56; Ex. 1020, 37–38, 44–47, 50–51, 53–54). We find Dr. Acampora’s testimony in his reply Declaration (Ex. 1017) simply provides further details to support that his testimony in his initial Declaration (Ex. 1012) is correct regarding the knowledge of the skilled artisan of GSM and his reply Declaration does no more than fairly and directly respond to Patent Owner’s Response (PO Resp. 14–21) and Dr. Short’s testimony

(Ex. 2003 ¶¶ 48–55). *See* 37 C.F.R. § 42.23(b); *see also Belden Inc., v. Berk-Tek LLC*, 805 F.3d 1064, 1078–80 (Fed. Cir. 2015) (holding that the Board may rely on new evidence submitted with a reply because the evidence was legitimately responsive to patent owner’s arguments and not needed for a prima facie case of obviousness).

When considering whether a claim would have been obvious “the knowledge of such an artisan is part of the store of public knowledge that must be consulted.” *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013). Based on the record before us, we agree with Petitioner (Pet. 2–3, 14–16, 20–36; Pet. Reply 15–18) and we credit and give significant weight to Dr. Acampora’s testimony (Ex. 1012 ¶¶ 22–28, 33, 48–57, 74, 76–78, 80–92; Ex. 1017 ¶¶ 3–12; Ex. 2004, 71:20–73:13, 96:2–97:21), over Dr. Short’s testimony (Ex. 2003 ¶¶ 48–55) because, based on the record before us, Dr. Short’s testimony does not take into account the knowledge of one having ordinary skill in the art regarding GSM set forth in Dr. Acampora’s initial declaration. *See, e.g.*, Ex. 1012 ¶¶ 33, 48; Ex. 1011, 316–317; *see also* Ex. 1017; Ex. 1018, 39–42, 60, 62; Ex. 1019, 39–40, 46–56; Ex. 1020, 1, 37–38, 44–47, 50–55.

We now turn to Petitioner’s argument and evidence supporting that one having ordinary skill in the art would have known how to implement the proposed modification and would have had a reasonable expectation of success because modifying Hovers would have been simple (in a non-GSM system). *See, e.g.*, Pet. 2–3, 14–33 (citing, *e.g.*, Ex. 1012 ¶¶ 22–28, 33, 48–65, 74, 78, 80–89). For the reasons given below, after consideration of Patent Owner’s assertions and evidence, we are persuaded by Petitioner’s showing that modifying Hovers would have been a simple software add-on

to Hovers's processing system. We note that this is a third, independent reason that we are persuaded by Petitioner's obviousness contentions and evidence for claim 1 and that Patent Owner's assertions and evidence do not undermine Petitioner's showing.

Patent Owner contends, on the basis that GSM is deficient, that modifying Hovers in the manner proposed by Petitioner "would have been extensive, complex, unjustified, and beyond the level of skill of the ordinary artisan." PO Resp. 21–23 (citing Ex. 2003 ¶¶ 56–61). Dr. Short testifies the modifications needed to implement Petitioner's proposal would have been "extensive" (Ex. 2003 ¶¶ 58–59), would have "completely contradict[ed] Hovers's basic concept of being an applique that is interoperable with a variety of standards" (*id.* ¶ 60), and "would have been beyond the level of one of ordinary skill in the art" (*id.* ¶ 61).

Patent Owner's contentions and Dr. Short's testimony are based on GSM being deficient, but for the reasons given above, we determine GSM is not deficient. Also, contrary to Dr. Short's testimony that the modifications would have been "extensive" (*id.* ¶¶ 58–59) and "beyond the level of one of ordinary skill in the art" (*id.* ¶ 61), Jetzek describes its "measurement command" as simply "a list of channel numbers, codes or other channel identifying information." Ex. 1004, 13:22–23. Additionally, Jetzek specifically describes how to make each of the modifications. For example, as explained in the Petition (*see, e.g.*, Pet. 31), Jetzek describes an exemplary handoff algorithm that makes use of the returned measurements (*id.* at 14:6–16:7, 16:20–21) and a mobile station that performs the signal quality measurements (*id.* at 13:22–25).

Dr. Short testifies the modifications needed to implement Petitioner's proposed modification would "completely contradict Hovers's basic concept of being an applique that is interoperable with a variety of standards." Ex. 2003 ¶ 60. As Dr. Short acknowledges (*id.*) and consistent with Dr. Acampora's testimony (Ex. 1012 ¶ 48), Hovers describes in addition to operating in a GSM environment, Hovers's wireless communication system 10 "may operate according to other wireless standards including, for example, CDMA (Code Division Multiple Access) standards such as IS-95A and IS-95B, CDMA2000, W-CDMA, TD SCDMA, TETRA, and TDMA (Time Division Multiple Access) standards such as IS-136 and IS-54, without departing from the scope of the present invention." Ex. 1003, 5:55–60 (cited at Ex. 1012 ¶ 48). Consistent with Dr. Acampora's testimony (*see, e.g.,* Ex. 1012 ¶¶ 61–65, 74), Jetzek similarly describes "the present invention is applicable to radiocommunication systems which employ any type of access methodology, e.g., Frequency Division Multiple Access (FDMA), *Time Division Multiple Access (TDMA)*, *Code Division Multiple Access (CDMA)*, or any hybrid thereof." Ex. 1004, 12:17–20 (emphasis added). We are not persuaded that operating Hovers's system in accordance with non-GSM wireless standards described in Hovers (Ex. 1003, 5:55–60) contradicts the teachings of Hovers. *See In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) ("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.").

Furthermore, Dr. Short's testimony that "the proposed modifications would have been beyond the level of one of ordinary skill in the art"

(*id.* ¶ 61) is conclusory and without persuasive supporting evidence or explanation to rebut Petitioner’s evidence and explanation. On this record, we find that Petitioner has provided persuasive evidence showing that implementing Jetzek’s hard handoff algorithm to determine if the mobile device should operatively associate with a different beam downlink transmitted by the smart antenna of Hovers based on the determined relative signal strength or quality parameters would not have been “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).

Patent Owner further contends that Petitioner’s proposed modification would have negatively impacted Hovers’s GSM system. PO Resp. 24–28 (citing Ex. 2003 ¶¶ 62–70). Importantly, Patent Owner’s contention in that regard pertains only to Hovers operating in a GSM environment (*id.*), not other environments, such as CDMA and TDMA specifically identified as alternatives in both Hovers and Jetzek. Ex. 1003, 5:55–60; Ex. 1004, 12:17–20.

Additionally, we agree with Petitioner that Patent Owner raises only one negative impact, i.e., “that ‘the frequency of dropped calls would increase’ in *limited circumstances*.” Pet. Reply 22 (citing PO Resp. 25; Ex. 2003 ¶ 48) (emphasis added). Consistent with Petitioner’s assertion (Pet. Reply 22), Dr. Short provides two exemplary scenarios and testifies that “the system has to be designed to handle the worst case scenario.” Ex. 2003 ¶ 65; *see also* Ex. 1016, 98:1–101:15. Although we again find that Patent Owner’s contention and evidence do not undermine Petitioner’s showing because GSM is not deficient, Patent Owner’s contention is further

flawed because “case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide [the] motivation [or reason] for the current invention.” *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004).¹⁴

Regarding Patent Owner’s second dispute, therefore, based on the record before us, we determine that the Petition demonstrates how a person having ordinary skill in the art could have implemented its proposed modifications, and that a person having ordinary skill in the art would have had a reasonable expectation of success. We further determine that Petitioner’s showing is not undermined by Patent Owner’s arguments or evidence.

Accordingly, upon consideration of the contentions and evidence presented by both parties, we find that Petitioner shows that all recitations 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 contentions 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), as obvious over Hovers and Jetzek.

¹⁴ For the same reasons, we are not persuaded by Patent Owner’s submission of testimony of a different expert relating to different art (PO Sur-Reply 17 (citing Ex. 2012)), particularly as here Petitioner shows GSM is not deficient, but instead already included the mobile reporting measurements in response to a command.

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. *Compare* Pet. 20–44 (discussing claims 17 and 33), *with id.* at 20–37 (discussing claim 1). We find that 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 logic in the smart antenna apparatus including processing system 102 having processing modules 62, as well as the knowledge of the skilled artisan. Pet. 24–25, 38–40 (citing Ex. 1003, 9:46–10:45, Figs. 2–5; Ex. 1006, 7:54–8:1; Ex. 1012 ¶¶ 76, 77, 97–99).

Patent Owner does not argue these claims separately. *See generally* PO Resp. Upon consideration of the contentions and evidence in the record before us, we find that Petitioner shows that all recitations in claims 17 and 33 are taught by the asserted art and that Petitioner articulates reasoning to combine the teachings in the manner recited in the claims. Pet. 20–44. Additionally, for the reasons given with respect to claim 1, we find Patent Owner's contentions and evidence do not undermine Petitioner's showing.

Accordingly, for the reasons given, 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), as obvious over Hovers and Jetzek.

5. *Discussion of Dependent Claims 2 and 18*

We turn to Petitioner's contentions regarding 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. With respect to the terms “access point” and “client device” recited in the claims, Petitioner asserts that a person having ordinary skill in the art uses (1) the terms “base station” and “access point” interchangeably and (2) the terms “mobile station” and “client device” interchangeably. Pet. 44 (citing, *e.g.*, Ex. 1001, 1:67–2:2, 4:44–45; Ex. 1012 ¶¶ 118, 119). Petitioner points to Hovers’s teachings of a base station system and a mobile station for “access point device” and “client device,” respectively. *Id.* For the reasons discussed *supra* in Section II.D.3 with respect to claim 1 and, in particular, limitation 1[a], we are persuaded by Petitioner’s contentions and we credit Dr. Acampora’s testimony because they are consistent with the evidence of record.

Patent Owner does not argue dependent claims 2 and 18 separately. *See generally* PO Resp. Upon consideration of the contentions and evidence in the record before us, we find that Petitioner shows that all recitations in claims 2 and 18 are taught by the asserted art and that Petitioner articulates reasoning to combine the teachings in the manner recited in the claims.

Accordingly, for the reasons given, 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), as obvious over Hovers and Jetzek.

6. *Discussion of Dependent Claims 4, 20, and 35*

We turn to Petitioner’s contentions regarding dependent claims 4, 20, and 35. 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.

Relying on the testimony of Dr. Acampora, Petitioner points to Hovers’s teachings of the smart antenna apparatus making beam selecting decisions based on beam signal quality and Jetzek’s teachings of the mobile station measuring signal quality of channels identified in a measurement command and reporting those measurements. Pet. 45–53 (citing, *e.g.*, Ex. 1003, 1:54–58, 7:17–51, 7:61–8:5, 12:4–13:25, 27:64–67, 41:62–67, 42:27–31; Ex. 1004, 1:21–24, 8:20–21, 12:21–24, 13:5–12, 13:22–14:5; Ex. 1012 ¶¶ 61–62, 121–130). Dr. Acampora testifies that the term “actively probe” recited in each of claims 4, 20, and 35 is described in the ’296 Patent Specification as beam switching logic being configured to “cause transceiver 112 to periodically send out probe information over one or more selected main beams that elicit some form of acknowledgement in return if received by client device 104.” Ex. 1012 ¶ 125 (citing Ex. 1001, 7:22–34). Dr. Acampora also testifies Jetzek’s “measurement command,” which “contains

a list of channel numbers, codes, or other channel identifying information” is sent and “elicits ‘some form of acknowledgement’ in the form of the mobile device’s measurements of the beams identified in the measurement command.” *Id.* ¶¶ 124–125 (citing, *e.g.*, Ex. 1004, 13:22–14:5).

Dr. Acampora further testifies that a person having ordinary skill in the art would have appreciated that Jetzek’s disclosure teaches “actively probing” recited in the claims. *Id.*

Consistent with Petitioner’s contentions and Dr. Acampora’s testimony, Jetzek describes “[w]hen the *mobile station receives a list of channel numbers, codes or other channel identifying information* in a measurement command, *it will measure the received signal quality* associated with each of those channels.” Ex. 1004, 13:22–24 (emphases added). Jetzek further describes if NEHO is employed, “the *mobile station will report the measurements to the system* which will then evaluate the various sectors using a handoff algorithm.” *Id.* at 14:1–3 (emphasis added). Patent Owner does not dispute that Jetzek teaches “actively probe” and further does not dispute that the asserted prior art teaches or suggests all elements of claims 4, 20, and 35. *See, e.g.*, PO Resp; *see also* Tr. 6:2–3.

Additionally, after consideration of Patent Owner’s contentions and the testimony of Dr. Short that the Petition fails to explain how a person having ordinary skill in the art could have implemented Jetzek’s “active measurement command” in Hovers’s system and has not shown that such person would have had a reasonable expectation of success (PO Resp. 14–28 (citing, *e.g.*, Ex. 2003 ¶¶ 48, 50–70)), we are persuaded by Petitioner’s contentions and we credit Dr. Acampora’s testimony over that of Dr. Short for dependent claims 4, 20, and 35 that one having ordinary skill in the art

would have had reason to make Petitioner’s proposed modification, would have known how to implement the proposed modification, and would have had a reasonable expectation of success. Pet. 45–53 (citing, *e.g.*, Ex. 1003, 1:54–58, 7:17–51, 7:61–8:5, 12:4–13:25, 27:64–67, 41:62–67, 42:27–31; Ex. 1004, 1:21–24, 8:20–21, 12:21–24, 13:5–12, 13:22–14:5; Ex. 1012 ¶¶ 61–62, 121–130). Above we discussed details of our analysis of Patent Owner’s contentions and why we find that Patent Owner’s contentions and evidence do not undermine Petitioner’s showing of a reason to combine Jetzek’s teaching of an “active measurement command” with Hovers. *See supra* § II.D.3.b.

Patent Owner does not argue dependent claims 4, 20, and 35 separately, although as discussed above, certain of Patent Owner’s contentions for independent claim 1 pertain to reasoning to combine relating to actively probe recited in these dependent claims. *See generally* PO Resp. Upon consideration of the contentions and evidence in the record before us, we find that Petitioner shows that all recitations in claims 4, 20, and 35 are taught by the asserted art and that Petitioner articulates reasoning to combine the teachings in the manner recited in the claims. We further find that Patent Owner’s contentions and evidence do not undermine Petitioner’s showing for the reasons given above and also with respect to claim 1.

Accordingly, for the reasons given, 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), as obvious over Hovers and Jetzek.

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

We turn to Petitioner's contentions regarding dependent claims 5, 21, and 36. 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.

Relying on the testimony of Dr. Acampora, Petitioner points to teachings in Hovers and Jetzek discussed *supra* in Sections II.D.3 and II.D.6 with respect to independent claim 1 and dependent claims 4, 20, and 35.

Pet. 54–58 (citing, *e.g.*, Ex. 1004, 13:11–16, 13:22–14:5, 14:10–15; Ex. 1012 ¶¶ 128, 129, 133–137). Petitioner, additionally, asserts that the mobile station reports measurements of signal quality of channels identified in Jetzek's "measurement command" and "[t]he 'measurement set' includes not only the beam(s) in the active set (to which the mobile station is currently connected) but also the neighbor set of beams (different beams to which the mobile station could potentially connect)." *Id.* at 55–57 (citing,

e.g., Ex. 1004, 13:11–16, 13:22–14:5, 14:10–15; Ex. 1012 ¶¶ 128, 129, 133–136). Dr. Acampora testifies that “[a] person skill in the art would have appreciated that, in the combination of Hovers and Jetzek in which an active probing process is used . . . the base station is capable of determining information necessary for beam switching by receiving a *plurality* of uplink transmittable messages through the smart antenna as required” by claims 5, 21, and 36, for example, because Jetzek teaches “the measurement command requests the mobile to make measurements on a ‘list’ of channels.”

Ex. 1012 ¶ 133 (citing Ex. 1004, 13:11–16, 13:22–14:5, 14:10–15). We credit and give significant weight to Dr. Acampora’s testimony because it is consistent with Jetzek’s teachings. *See* Ex. 1004, 13:11–16 (describing measuring “[t]he strength of the received signals” and determining “[t]he bit error rate of the received signal . . . as an indication of received signal quality”), 13:22–24 (describing that “[w]hen the mobile station receives a list of channel numbers, codes or other channel identifying information in a measurement command, it will measure the received signal quality associated with each of those channels”), 14:1–3 (describing that “if network evaluated handoff (NEHO) is employed, then the mobile station will report the measurements to the system which will then evaluate the various sectors using a handoff algorithm”).

Dr. Acampora also testifies that Jetzek’s “‘measurement set’ includes the beams in the active set and the neighbor set of beams.” *Id.* ¶ 135 (citing Ex. 1004, 14:10–11). We again credit and give significant weight to Dr. Acampora’s testimony because it is consistent with the teachings of Jetzek. For example, Jetzek describes that “[t]he measurement set in this example contains all sectors of the active set and all the neighbors of the

active set.” Ex. 1004, 14:10–11; *see also id.* at 14:13–15 (“The measurement set typically includes all members of the active set, as well as transmission sources which are neighbors of the transmission sources in the active set.”)

Patent Owner does not argue dependent claims 5, 21, and 36 separately although as discussed above in Section II.D.6 with respect to claim 4, 20, and 35, certain of Patent Owner’s contentions for independent claim 1 pertain to reasoning to combine relating to actively probe recited in these dependent claims. *See generally* PO Resp. Upon consideration of the contentions and evidence in the record before us, we find that Petitioner shows that all recitations in claims 5, 21, and 36 are taught by the asserted art and that Petitioner articulates reasoning to combine the teachings in the manner recited in the claims. We further find Patent Owner’s contentions and evidence do not undermine Petitioner’s showing for the reasons given above and with respect to claim 1.

Accordingly, for the reasons given, 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), as obvious over Hovers and Jetzek.

8. *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 “[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. Acampora, Petitioner points to Hovers’s teachings of locating and tracking mobile stations. Pet. 58–59 (citing, *e.g.*, Ex. 1003, 1:30–34, 7:8–29, 7:52–61; Ex. 1012 ¶¶ 138–141). Dr. Acampora testifies that “[t]he smart antenna system and method of Hovers is capable of determining information about a current position of the mobile as claimed.” Ex. 1012 ¶ 138. Dr. Acampora also testifies that evidence supporting his opinion is Hovers’s description of tracking mobile devices, as well as Hovers’s description of determining signal strength and quality, which a person skilled in the art would have understood involved Hovers tracking the mobile device as it moves among the various beams. *Id.*

We credit and give significant weight to Dr. Acampora’s testimony because it is consistent with Hovers’s teachings. For example, Hovers describes that “smart antenna system 14 may locate and track mobile stations 15 as they move within wide beam 32.” Ex. 1003, 7:58–59. Hovers also describes selecting the best narrow beam “based on one or more inputs or parameters,” including “signaling information,” as well as “signal strength, signal quality, relevant power, and history of signals received.” *Id.* at 7:22–29.

Patent Owner does not argue dependent claims 6, 22, and 37 separately. *See generally* PO Resp. Upon consideration of the contentions and evidence in the record before us, we find that Petitioner shows that all recitations in claims 6, 22, and 37 are taught by the asserted art and that Petitioner articulates reasoning to combine the teachings in the manner recited in the claims.

Accordingly, for the reasons given, 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), as obvious over Hovers and Jetzek.

9. *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 “[comparing or compare] said determined information to corresponding beam association threshold information.” Ex. 1001, 12:3–5, 14:38–40, 16:29–30. Relying on the testimony of Dr. Acampora, Petitioner points to Jetzek’s teaching of an algorithm that involves comparing measured signal quality level with a threshold value. Pet. 60–61 (citing, *e.g.*, Ex. 1004, 15:22–16:7; Ex. 1012 ¶¶ 142, 145, 146). Dr. Acampora testifies that “a person skilled in the art, viewing the combined disclosures of Hovers and Jetzek, would have been motivated to implement a hard handoff methodology in determining whether a mobile device should associate with a different beam downlink from a current beam downlink” and “[i]n so doing, the person skilled in the art would have configured the logic in the smart antenna base station of Hovers to be capable of comparing the determined information (that is, the signal quality level) with a threshold value, as claimed.” Ex. 1012 ¶ 145. Dr. Acampora also testifies

[t]his is evident from the disclosure of Jetzek, which illustrates a hard handoff from Sector B (Beam B) to Sector D (Beam D). The hard handoff takes place when the quality of the source in Sector D (that is, Beam D) exceeds the hard handover threshold (“hard_ho_th”) relative to Sector B (that is, Beam B). Ex. 1004, 15:22–16:4; Fig. 7. As Jetzek explains, a hard handoff will take precedence over a soft handoff where “the hard handover threshold is exceeded.” Ex. 1004, 16:5–7.

Id. ¶ 146.

We are persuaded by Petitioner’s showing and we credit and give significant weight to Dr. Acampora’s testimony because they are consistent with Hovers’s and Jetzek’s teachings. For example, consistent with Petitioner’s contentions and Dr. Acampora’s testimony, Jetzek describes that “‘hho_th’ represents the *threshold* user for hard handover” and that “[a] hard handover from the current active set to a new sector is carried out if the quality Q_x of sector X fulfills the following condition: $Q_x > Q_{best} + hho_th$.” Ex. 1004, 15:22–16:1 (emphasis added). Jetzek also states that “[t]he actions described in this handoff algorithm to add, delete or replace a sector occur as soft handoffs in the example, *unless the hard handoff threshold is exceeded in which case hard handoff takes precedence.*” *Id.* at 16:5–7 (emphasis added).

Patent Owner does not argue dependent claims 7, 23, and 38 separately. *See generally* PO Resp. Upon consideration of the contentions and evidence in the record before us, we find that Petitioner shows that all recitations in claims 7, 23, and 38 are taught by the asserted art and that Petitioner articulates reasoning to combine the teachings in the manner recited in the claims.

Accordingly, for the reasons given, 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), as obvious over Hovers and Jetzek.

E. Petitioner's Motion to Exclude

Petitioner filed a Motion to Exclude Evidence (Paper 36, “Mot. to Exclude”); Patent Owner filed an Opposition (Paper 37); and Petitioner filed a Reply in support of its Motion to Exclude (Paper 38). In its Motion to Exclude Evidence, Petitioner seeks to exclude Exhibit 2012 and portions of the record that reference this exhibit. Mot. to Exclude 1. Petitioner asserts that Exhibit 2012 is a deposition transcript from a different proceeding to which Petitioner is not a party, and from a declarant who did not provide testimony in this proceeding. *Id.*

Under the particular circumstances in this case, as discussed above, even after considering Patent Owner's evidence that Petitioner seeks to exclude, we have determined that Petitioner has demonstrated by a preponderance of the evidence that the challenged claims are unpatentable. Accordingly, we deny Petitioner's Motion to Exclude Evidence.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that the challenged claims of the '296 Patent are unpatentable as obvious over Hovers and Jetzek.

IV. ORDER

Accordingly, it is:

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 Petitioner's Motion to Exclude 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.

IPR2018-00725
Patent 7,062,296 B2

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