

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SPRINT SPECTRUM L.P.,  
Petitioner

v.

GENERAL ACCESS SOLUTIONS LTD.,  
Patent Owner.

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Case IPR2017-01887 Patent 6,891,810 B2

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PATENT OWNER'S NOTICE OF APPEAL

Pursuant to 35 U.S.C. §§ 141, 142, and 319, and 37 C.F.R. §§ 90.2-90.3, notice is hereby given that Patent Owner General Access Solutions Ltd. appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision of the Patent Trial and Appeal Board (“Board”) entered on March 7, 2019 (Paper 53) in IPR2017-01887, and from all underlying orders, decisions, rulings, and opinions. A copy of the Final Written Decision is attached.

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Patent Owner further indicates that the issues on appeal include, but are not limited to: (1) the Board’s determinations that Petitioner has shown, by a preponderance of the evidence, that claims 1–14 of Patent 6,891,810 B2 are unpatentable; (2) the Board’s claim construction analysis and determinations; and (3) all other issues decided adversely to the Patent Owner in any order, decision, ruling or opinion underlying or supporting the Final Written Decision.

Pursuant to 35 U.S.C. § 142 and 37 C.F.R. § 90.2(a), this Notice is being filed with the Director of the United States Patent and Trademark Office, and a copy of this Notice is being concurrently filed with the Patent Trial and Appeal Board. In addition, a copy of this Notice and the required docketing fees are being filed with the Clerk’s Office for the United States Court of Appeals for the Federal Circuit via CM/ECF.

Dated: May 8, 2019

Respectfully submitted,

**McCAULLEY DOWELL LLC**

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**CERTIFICATE OF FILING**

It is certified that, in addition to being filed electronically through the Patent Trial and Appeal Board's E2E System on May 8, 2019, a true and correct copy of the foregoing PATENT OWNER'S NOTICE OF APPEAL has been filed by federal express on May 8, 2019 (for hand delivery on May 9, 2019), with the Director of the United States Patent and Trademark Office, at the following address:

Director of the United States Patent and Trademark Office  
c/o Office of the General Counsel  
10B20, Madison Building East,  
600 Dulany Street  
Alexandria, VA 22314-5793

Dated: May 8, 2019

Respectfully submitted,

By: /Richard T. McCaulley, Jr./  
Richard T. McCaulley, Jr.  
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**CERTIFICATE OF FILING**

It is certified that a true and correct copy of the foregoing PATENT OWNER'S NOTICE OF APPEAL was filed electronically through the United States Court of Appeals for the Federal Circuit's CM/ECF system May 8, 2019 (with payment of all necessary docketing fees).

Dated: May 8, 2019

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

The undersigned certifies that a true and correct copy of the foregoing PATENT OWNER'S NOTICE OF APPEAL was served by filing this document through the Patent Trial and Appeal Board End to End (PTAB E2E) as well as providing a courtesy copy via e-mail to the following attorneys of record for the Petitioner listed below:

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Dated: May 8, 2019

Respectfully submitted,

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SPRINT SPECTRUM, L.P.,  
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Patent Owner.

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Case IPR2017-01885 (Patent 7,173,916 B2)  
Case IPR2017-01887 (Patent 6,891,810 B2)

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Before MELISSA A. HAAPALA, *Acting Vice Chief Administrative Patent Judge*, KALYAN K. DESHPANDE and DAVID M. KOHUT, *Administrative Patent Judges*.

DESHPANDE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION  
*Inter Partes* Review  
35 U.S.C. § 318(a); 37 C.F.R. § 42.73

## I. INTRODUCTION

### A. Background

Sprint Spectrum L.P. (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–16 of U.S. Patent No. 7,173,916 B2 (Ex. 1001,<sup>1</sup> “the ’916 patent”) and claims 1–14 of U.S. Patent No. 6,891,810 B2 (1887 Ex. 1001, “the ’810 patent”). Paper 1 (“1885 Pet.” or “Pet.”); 1887 Paper 1 (“1887 Pet.”).

Pursuant to 35 U.S.C. § 314, we instituted *inter partes* review of the ’916 patent and the ’810 patent, on March 9, 2018, under 35 U.S.C. § 103(a), as to claims 1–16 of the ’916 patent as unpatentable over Ahy<sup>2</sup> and Csapo,<sup>3</sup> and claims 1–3, 6, 8–10, and 13 of the ’810 patent as unpatentable over Ahy and Csapo, and claims 2–7 and 9–14 of the ’810 patent as unpatentable over Ahy Csapo, and Sanders.<sup>4</sup> Paper 6 (“Dec.”); 1887 Paper 5 (“1887 Dec.”). On April 24, 2018, the Supreme Court held that a final written decision under 35 U.S.C. § 318(a) must decide the patentability of all

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<sup>1</sup> IPR2017-01885 and IPR2017-01887 include substantially the same papers and exhibits. The arguments and evidence set forth by Petitioner and Patent Owner are generally similar in IPR2017-01885 and IPR2017-01887. Accordingly, we issue a consolidated Final Written Decision, and all citations are to IPR2017-01885 unless otherwise indicated. Citations to IPR2017-01885 may be preceded by “1885” and citations to IPR2017-01887 are preceded by “1887.”

<sup>2</sup> U.S. Patent No. 7,366,133 B1, issued Apr. 29, 2008 (Ex. 1004, “Ahy”).

<sup>3</sup> U.S. Patent No. 6,411,825 B1, issued June 25, 2002 (Ex. 1006, “Csapo”).

<sup>4</sup> Sanders, Ray, “Proposed Amendments to 802.16.1pc-00/02 for a PHY Layer to Include a Bandwidth-On-Demand MAC/PHY Sublayer,” IEEE 802.16 Broadband Wireless Access Group, December 24, 1999 (1887 Ex. 1006, “Sanders”).



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claims challenged in the petition. *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348 (2018); *see also* “*Guidance on the Impact of SAS on AIA Trial Proceedings*” (Apr. 26, 2018), <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial> (stating that if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition). Accordingly, on April 28, 2018, we issued an Order modifying our Decisions to further institute *inter partes* review of claims 1–16 of the ’916 patent as unpatentable over Klein<sup>5</sup> and a person with ordinary skill in the art, claims 1 and 8 of the ’810 patent as unpatentable over Klein and a person with ordinary skill in the art, and claims 2–7 and 9–14 of the ’810 patent as unpatentable over Klein, a person with ordinary skill in the art, and Sanders. Paper 9; 1887 Paper 8.

Patent Owner filed a Response in each proceeding ((Paper 31, “PO Resp.”); (Paper 29, “1887 PO Resp.”)), Petitioner filed a Reply in each proceeding ((Paper 41, “Pet. Reply”); (Paper 38, “1887 Pet. Reply”)), and Patent Owner filed a Sur-Reply in each proceeding ((Paper 50, “PO Sur-Reply”); (Paper 46, “1887 PO Sur-Reply”)). A consolidated oral hearing was held on December 6, 2018, and the hearing transcript has been entered in the record. Paper 56 (“Tr.”). Petitioner also filed a Motion to Exclude (Paper 45, “Pet. MTE”), to which Patent Owner filed an Opposition (Paper 51, “PO MTE Opp.”), and Petitioner filed a Reply to Patent Owner’s Opposition (Paper 53, “Pet. MTE Reply”). Patent Owner also filed a Motion to Strike (Paper 48, “PO MTS”), to which Petitioner filed an Opposition (Paper 52, “Pet. MTS Opp”).

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<sup>5</sup> Klein et al., “PHY Layer Proposal for BWA”, IEEE 802.16, January 5, 2000 (Ex. 1005, “Klein”).

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We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. Pursuant to our jurisdiction under 35 U.S.C. § 6, we conclude, for the reasons discussed below, that Petitioner has shown by a preponderance of the evidence that claims 1–16 of the '916 patent and claims 1–14 of the '810 patent are unpatentable under 35 U.S.C. § 103(a).

*B. Related Proceedings*

The parties indicate that the '916 patent and '810 patent are involved in *General Access Solutions, Ltd. v. Sprint Spectrum L.P.*, Civil Action No. 2:16-CV-465 (E.D. Tex.). Pet. 2; Paper 3, 1; 1887 Pet. 2; 1887 Paper 3, 1. IPR2017-01889 involves the same parties and is also before the Board.

*C. The '916 Patent and the '810 Patent*

The '916 patent and the '810 patent disclose an improved air interface system for use in a fixed wireless access network that maximizes usage of the available bandwidth in a cell site. Ex. 1001, 9:9–11; 1887 Ex. 1001, 9:9–11.<sup>6</sup> The '916 patent and the '810 patent provide a radio frequency (RF) modem shelf for use in a fixed wireless access network comprising a plurality of base stations capable of bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality of subscriber premises. *Id.* at 9:35–40.

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<sup>6</sup> The '916 patent and '810 patent include substantially similar specifications and figures. Accordingly, all citations are to the '916 patent unless otherwise specified.

The fixed wireless access network is disclosed in Figure 1 as follows:

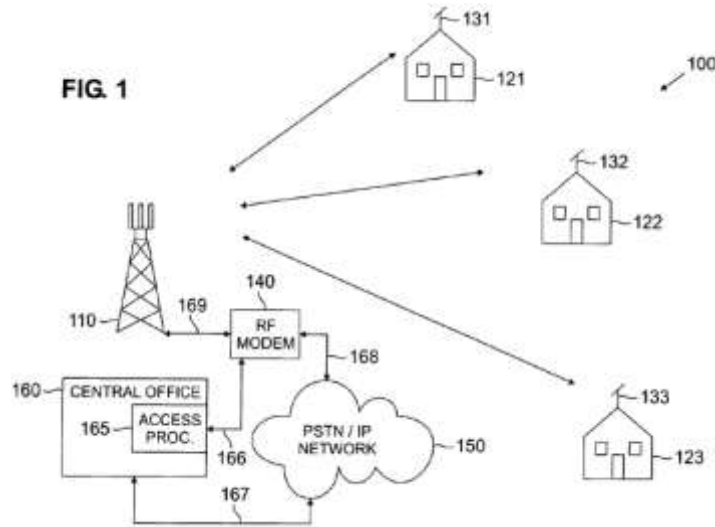


Figure 1 illustrates fixed wireless access network 100, which comprises transceiver base station 110 that transmits forward channel broadband signals to subscriber premises 121, 122, 123, and antennas 131, 132, and 133. *Id.* at 11:57–12:6. Transceiver base station 110 is coupled to RF modem shelf 140, which converts baseband data traffic received from external network 150 to RF signals transmitted in the forward channel to subscriber premises 121, 122, and 123. *Id.* at 12:15–22.

RF modem shelf 140 comprises a plurality of RF modems capable of modulating the baseband data traffic and demodulating the reverse channel RF signals. *Id.* at 12:23–26. Transceiver base stations cover a cell site area that is divided into a plurality of sectors, and each RF modem shelf is assigned to modulate and demodulate signals in a particular sector of each cell site. *Id.* at 12:27–32.

#### *D. Illustrative Claims*

Petitioner challenges claims 1–16 of the '916 patent and claims 1–14 of the '810 patent. Pet. 13–66; 1887 Pet. 13–64. Claims 1 of each patent are illustrative of the claims at issue and are reproduced below:

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1. For use in a fixed wireless access network comprising a plurality of base stations performing bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality of subscriber premises, a radio frequency (RF) modem shelf comprising:

a first RF modem communicating with a plurality of said wireless access devices using TDD frames, each TDD frame having an uplink for receiving data and a downlink for transmitting data; and

a modulation controller associated with said RF modem shelf determining an optimum modulation configuration for each of said plurality of wireless access devices communicating with said first RF modem, wherein said modulation controller causes said first RF modem to transmit downlink data to a first wireless access device in a first data block within a TDD frame using a first modulation configuration and to transmit downlink data to a second wireless access device in a second data block within said TDD frame using a different second modulation configuration.

Ex. 1001, 25:35–54.

1. For use in a fixed wireless access network comprising a plurality of base stations performing bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality of subscriber premises, a radio frequency (RF) modem shelf comprising:

a first RF modem communicating with a plurality of said wireless access devices using TDD frames, each TDD frame having an uplink for receiving data and a downlink for transmitting data; and

a modulation controller associated with said RF modem shelf determining an optimum modulation configuration for each of said plurality of wireless access devices communicating with said first RF modem, wherein said modulation controller causes said first RF modem to transmit first downlink data to a first wireless access device in a first data block having a first optimum modulation configuration and to transmit second downlink data to said first wireless access device in a second

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data block having a different second optimum modulation configuration.

1887 Ex. 1001, 25:38–57.

## II. ANALYSIS

### A. Claim Construction

We interpret claims of an unexpired patent using the broadest reasonable interpretation in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b) (2017);<sup>7</sup> *see also* *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard as the claim construction standard to be applied in an *inter partes* review proceeding). Under the broadest reasonable interpretation standard, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art, in the context of the entire disclosure. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”). We determine that no terms need to be construed for the purposes of this decision.

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<sup>7</sup> A recent amendment to this rule does not apply here because the Petition was filed before November 13, 2018. *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).

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*B. Level of Ordinary Skill in the Art*

“Section 103(a) forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).

Mr. James A. Proctor Jr., Petitioner’s expert, explains that a hypothetical person of ordinary skill in the art, with respect to and at the time of the ’916 patent and ’810 patent, would have “a Bachelor of Science in Computer Science, Computer Engineering, Electrical Engineering, or an equivalent field as well as at least 2 years of academic or industry experience in both wireless networking and related protocols.” Pet. 8 (citing Ex. 1003 ¶ 27); 1887 Pet. 7 (citing 1887 Ex. 1003 ¶ 24).<sup>8</sup> Patent Owner agrees. PO Resp. 2–3; 1887 PO Resp. 2.

We accept Petitioner and Patent Owner’s proffered level of ordinary skill in the art as it is agreed upon and consistent with the prior art of record. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“[T]he level of skill in the art is a prism or lens through which a judge, jury, or the Board views the

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<sup>8</sup> Petitioner argues that Mr. Humphrey, Patent Owner’s expert, has a degree in “Ceramic Engineering,” and does not qualify as a person with ordinary skill in the art under Patent Owner’s own definition. Pet. Reply 25 n. 15. Petitioner, however, does not explain the difference between Mr. Humphrey’s testimony and the testimony that a person with ordinary skill in the art would offer. Accordingly, we understand Petitioner’s footnote to be directed towards the weight we afford Mr. Humphrey’s testimony.

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prior art and the claimed invention.”); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991) (“The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry.”). To that end, we note that the prior art itself often reflects an appropriate skill level. *See Okajima*, 261 F.3d at 1355.

*C. Obviousness of claims 1–16 of the ’916 patent and claims 1–3, 6, 8–10, and 13 of the ’810 patent over Ahy and Csapo*

Petitioner contends that claims 1–16 of the ’916 patent are unpatentable under 35 U.S.C. § 103 as obvious over Ahy and Csapo. Pet. 13–47. Petitioner contends that claims 1–3, 6, 8–10, and 13 of the ’810 patent are unpatentable under 35 U.S.C. § 103 as obvious over Ahy and Csapo. 1887 Pet. 13–37. For the reasons discussed below, we determine that Petitioner has established, by a preponderance of the evidence, that claims 1–16 of the ’916 patent and 1–3, 6, 8–10, and 13 of the ’810 patent are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Ahy and Csapo.

*1. Ahy (Ex. 1004)*

Ahy is directed to wireless communication systems, including adaptive point to multipoint wireless communication. Ex. 1004, 1:19–21. The disclosed method and system integrates adaptive and dynamic responsiveness for communication parameters related to multiple characteristic of wireless communication links. *Id.* at 1:67–2:3. In a first aspect, a wireless physical (PHY) layer and wireless media-access-control (MAC) layer collectively include a set of communication parameters, each of which is adaptively modified by a base station controller (BSC) for communication with a plurality of customer premises equipment (CPE). *Id.* at 2:15–21. In a second aspect, a wireless transport layer includes adaptive

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and dynamic characteristics responsive to communication characteristics between the BSC and each selected CPE. *Id.* at 2:33–36. These communication characteristics are responsive to each individual communication link so as to optimize communication bandwidth between the BSC and each selected CPE. *Id.* at 2:37–40.

2. *Priority date of the challenged claims of the '916 patent and the '810 patent with respect to Ahy*

Petitioner asserts that Ahy was filed on July 21, 2000, and qualifies as prior art under at least 35 U.S.C. § 102(e). Pet. 3; 1887 Pet. 3. Patent Owner argues that Mr. Paul Struhsaker, a named inventor of the '916 patent and the '810 patent, conceived of and diligently reduced to practice the inventions of the '916 patent and '810 patent at least by July 20, 2000, before the filing date of Ahy. PO Resp. 13–35; 1887 PO Resp. 13–35. Patent Owner provides the testimony of Mr. Michael Eckert and other contemporaneous documents to corroborate that Mr. Struhsaker conceived of the subject matter claimed prior to July 21, 2000. *Id.*; 1887 PO Resp. 13–35.

In an *inter partes* review, the burden of persuasion is on the petitioner to prove “unpatentability by a preponderance of the evidence.” 35 U.S.C. § 316(e). A petitioner also has the initial burden of production, or the burden of going forward with evidence. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1379 (Fed. Cir. 2015).

Petitioner met its initial burden of production by offering Ahy into evidence and asserting that Ahy is prior art, under 35 U.S.C. § 102(e), to the '916 patent and the '810 patent because the actual filing date of Ahy is before the actual filing date of the '916 and '810 patents. *See* Pet. 3; 1887 Pet. 3. The burden of production then shifted to Patent Owner to produce



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evidence supporting a date of invention before Ahy. *See Dynamic Drinkware*, 800 F.3d at 1379–80; *Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1576–77 (Fed. Cir. 1996).

A “patentee bears the burden of establishing that its claimed invention is entitled to an earlier priority date than an asserted prior art reference.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016). The Federal Circuit has held:

When the issue of priority concerns the antedating of a reference, the applicant is required to demonstrate, *with sufficient documentation*, that the applicant was in possession of the later-claimed invention before the effective date of the reference. *Demonstration of such priority requires documentary support, from which factual findings and inferences are drawn, in application of the rules and law of conception, reduction to practice, and diligence.* The purpose is not to determine priority of invention—the province of the interference practice—but to ascertain whether the applicant was in possession of the claimed invention sufficiently to overcome the teachings and effect of an earlier publication of otherwise invalidating weight.

*In re Steed*, 802 F.3d 1311, 1316 (Fed. Cir. 2015) (emphases added); *see also Perfect Surgical Techniques, Inc. v. Olympus America, Inc.*, 841 F.3d 1004, 1008 (Fed. Cir. 2016) (citing *Steed*).

Patent Owner contends that Ahy is not prior art to the ’916 patent and the ’810 patent because the claimed inventions were conceived of before the filing date of Ahy, and thereafter the conceived inventions were diligently reduced to practice. PO Resp. 13–35; 1887 PO Resp. 13–35. We, however, are not persuaded that Patent Owner has established conception of the claimed invention prior to Ahy for the reasons discussed below.

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*a. Conception*

“[C]onception is established when the invention is made sufficiently clear to enable one skilled in the art to reduce it to practice without the exercise of extensive experimentation or the exercise of inventive skill.” *Hiatt v. Ziegler*, 179 USPQ 757, 763 (Bd. Pat. Inter. 1973). “Conception must be proved by corroborating evidence which shows that the inventor disclosed to others his ‘completed thought expressed in such clear terms as to enable those skilled in the art’ to make the invention.” *Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985) (quoting *Field v. Knowles*, 183 F.2d 593, 601 (CCPA 1950)). “[C]onception must encompass all limitations of the claimed invention.” *Brown v. Barbacid*, 276 F.3d 1327, 1336 (Fed. Cir. 2002).

Patent Owner asserts that the subject matter of the claims of the ’916 patent and the ’810 patent was completely conceived by at least May 24, 2000. PO Resp. 16; 1887 PO Resp. 16–17. Mr. Struhsaker states that he and Mr. Eckert conceived of the “Total Access System” in late 1999. PO Resp. 15 (citing Ex. 2472 ¶ 10); 1887 PO Resp. 16 (citing 1887 Ex. 2472 ¶ 10). Patent Owner asserts that on May 24, 2000, Mr. Struhsaker memorialized conception of the “Total Access System” by drafting a document entitled “Last Mile Business Overview.” *Id.*; 1887 PO Resp. 16. Accordingly, Patent Owner asserts that conception of the claimed invention is demonstrated by “Last Mile Business Overview.” *Id.* (citing Ex. 2457); 1887 PO Resp. (citing 1887 Ex. 2457); Ex. 2472 ¶ 16.

We, however, are not persuaded the claimed inventions of the ’916 patent and the ’810 patent were conceived of prior to the filing date of Ahy because (i) Patent Owner did not to set forth in its briefing persuasive

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arguments and evidence demonstrating that each claim element was disclosed in the “Last Mile Business Overview,” and (ii) even if we were to consider the statements provided by Mr. Struhsaker, absent a discussion of this issue in Patent Owner’s briefing, we are not persuaded that Patent Owner has established that the feature of “determining of an optimum modulation configuration” was conceived of prior to the filing date of Ahy.

*i. Improper Incorporation by Reference*

In its Response, Patent Owner sets forth that Mr. Struhsaker memorialized the conception of the claims of the ’916 patent and the ’810 patent in the document entitled the “Last Mile Business Overview,” which discloses the “Total Access System,” at least as of May 24, 2000. PO Resp. 16; 1887 PO Resp. 16. Patent Owner asserts that Mr. Struhsaker provides an analysis of mapping the claims of the ’916 patent and the ’810 patent to the “Last Mile Business Overview.” PO Resp. 16–17 (citing Ex. 2457); 1887 PO Resp. 16–17 (citing 1887 Ex. 2457). Patent Owner argues that “[i]n mapping the claim elements to Exhibit 2457 Mr. Struhsaker demonstrates that at least as of May 24, 2000 he had conceived of the inventions claimed” in the ’916 patent and the ’810 patent. PO Resp. 16; 1887 PO Resp. 17. Patent Owner argues that “[i]n reducing the idea to writing in Exhibit 2457, Mr. Struhsaker demonstrates that he had a permanent idea of the operative invention in those claims as it was to be put into practice.” PO Resp. 16–17; 1887 PO Resp. 17.

“Arguments must not be incorporated by reference from one document into another document.” 37 C.F.R. § 42.6(a)(3). Patent Owner acknowledges it is incorporating Exhibit 2457 into its Response and has not provided a substantive analysis of the conception of the claims of the ’916

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patent and the '810 patent in its Response or Sur-Reply. *See* Tr. 44:4–16; PO Resp. 16–17; PO Sur-Reply 1–2; 1887 PO Resp. 16–17; 1887 PO Sur-Reply 1–2. Therefore, Patent Owner attempts to improperly incorporate the arguments set forth in Exhibit 2457 into its own briefing. Accordingly, we do not consider the arguments and evidence set forth in Exhibit 2457 that are not substantively presented in Patent Owner's Response or Sur-Reply.

Based on the arguments offered by Patent Owner in its Response, which merely direct us to incorporate arguments set forth in Exhibit 2457, we determine that Patent Owner has not established that Mr. Struhsaker conceived of the challenged claims of the '916 patent and the '810 patent. Accordingly, we determine that the inventions in the '916 and '810 patent were not conceived of prior to the filing date of Ahy, and, therefore, Ahy qualifies as prior art under 35 U.S.C. § 102(e). *See* Pet. 3; 1887 Pet. 3.

*ii. Patent Owner failed to establish that the feature “determining an optimum modulation configuration” was conceived prior to the priority date of Ahy*

Even if we consider the arguments and evidence set forth in Exhibit 2457, we are not persuaded that Patent Owner has demonstrated that the feature of “determining an optimum modulation configuration” was conceived prior to the filing date of Ahy. PO Resp. 16–17; 1887 PO Resp. 16–17. Mr. Struhsaker provides a claim chart summarizing mapping the subject matter of claims 1–7 and 9–15 of the '916 patent and claims 1–14 of the '810 patent to the “Last Mile Business Overview.” Ex. 2472, App'x A; 1887 Ex. 2472, App'x A. Patent Owner further provides the Declaration of Mr. Eckert as corroboration of Mr. Struhsaker's statements. Ex. 2456 ¶¶ 12–14; 1887 Ex. 2456 ¶¶ 12–14.

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As evidence of conception of “determining an optimum modulation configuration,” Patent Owner relies upon Mr. Struhsaker’s testimony that

The excerpt from Slide 21 below indicates that the system determines an optimum modulation configuration (order and coding rate) for each wireless access device communicating with the RF modem discussed above.

The optimum downlink modulation configuration transitions from 64QAM to 16QAM as a function of increasing distance of wireless access devices from the cell tower/base station which is also a function of the specific transmission band, in this case “FWA” versus “UNII”. These changes in optimal modulation reflect changes in overall signal quality. Again, the modulation configurations shown in Slide 21 are shown in the context of TDD transmissions.

Ex. 2472, 13 (App’x A, 3). Patent Owner does not provide any more analysis identifying the disclosure in the “Last Business Mile Overview” as evidence of conception of the limitation “determining an optimum modulation configuration.”

Petitioner argues that Patent Owner identifies “RF Modem cards that are responsible for the modulation complexity or modulation index of each downlink (DL) transmission,” but “fails to show how those cards would *determine* an optimum modulation configuration.” Pet. Reply 3 (quoting Ex. 1012 ¶ 12; citing Ex. 2472, App’x A, 5); 1887 Pet. Reply 3. Petitioner argues that, at best, the “Last Business Mile Overview” describes “that the modulation index is determined based on link distance and the frequency band of transmission.” *Id.* (citing Ex. 1012 ¶ 12). Such a system would not, in Petitioner’s view, “determine an *optimum* modulation configuration” because a “modulation index based only on link distance (as shown in Ex. 2457) might be optimum for a first customer premises equipment (CPE) in a

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first location, but not optimum for a second CPE in a second location, even if the locations have the same distance from the base station.” Pet. Reply 5–6 (citing Ex. 1012 ¶¶ 16–21) (emphasis omitted).

Patent Owner responds that the “Last Mile Business Overview” describes more than a fixed distance system using only link distance to determine modulation parameters. PO Sur-Reply 2–7. In addition to the “Last Mile Business Overview,” Patent Owner asserts that an email from Mr. Struhsaker to Mr. Eckert further “confirms that Mr. Struhsaker contemplated more than just link distance to determine modulation parameters.” *Id.* at 4–5 (citing Ex. 1271). Patent Owner further directs us to the Declaration of Mr. Struhsaker where additional channel conditions, beyond link distance and frequency, are discussed as impacting signal strength to the user. *Id.* at 3–4 (citing Ex. 2472,<sup>9</sup> App’x A, 7).

We are not persuaded that Patent Owner has provided sufficient corroborating evidence to prove that the inventors of the ’916 patent and the ’810 patent conceived of the claimed “determining an optimum modulation configuration” prior to the filing date of Ahy. As an initial matter, Petitioner and Patent Owner agree that the “Last Mile Business Overview” describes varying modulation configurations by link distance. Pet. Reply 4–5; PO Sur-Reply 4. We agree with Petitioner that such a system would not take into account actual channel conditions and, therefore, would not “optimize” the modulation. Pet. Reply 4–6 (citing Ex. 1012 ¶ 14).

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<sup>9</sup> Patent Owner’s Sur-Reply refers to Mr. Struhsaker’s Declaration, but provides the citation to the “Last Mile Business Overview” at Exhibit 2457. The citation is understood to reference Mr. Struhsaker’s Declaration at Exhibit 2472.

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Although we agree with Patent Owner that its proffered evidence describes more than mere modulation configurations that varied by link distance, we are not persuaded that evidence is sufficient to corroborate conception of the “determination of an *optimum* modulation configuration” because it does not describe what the optimum modulation is or how such optimum modulation is determined. Rather, we agree with Petitioner that the evidence does not establish that “there were some consideration of these channel conditions in order to optimize.” Tr. 13:10–11. Absent evidence corroborating the conception of “determining an *optimum* modulation configuration,” Patent Owner has not established conception of all limitations of the claimed inventions.

Accordingly, we determine Patent Owner fails to prove conception of “determining an optimum modulation configuration,” as recited by independent claims 1 and 9 of the ’916 patent and independent claims 1 and 8 of the ’810 patent, prior to July 21, 2000, the filing date of Ahy. For the same reasons, we determine that Patent Owner has not established conception of dependent claims 2–8 and 10–16 of the ’916 patent and dependent claims 2–7 and 9–14 of the ’810 patent because these claims incorporate “determining an optimum modulation configuration” based on their dependency on the independent claims.

*b. Reasonable Diligence in Reducing the Invention to Practice*

As discussed above, we determine that Patent Owner has not established conception of the challenged claims prior to July 21, 2000. Accordingly, we need not reach whether Patent Owner has diligently reduced to practice the conceived invention.

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### 3. *Priority Date of Ahy*

Petitioner argues that Ahy is entitled to the filing date of its parent patent, U.S. Patent No. 6,654,384 B1. Pet. Reply 13–21; 1887 Pet. Reply 14–23. We, however, determine that Ahy qualifies as prior art with respect to the challenged claims of the '916 patent and the '810 patent based on its actual filing date. *See* Section II.C.2. Because we determine that Ahy qualifies as prior art based on its actual filing date, we need not reach the issue of whether Ahy is entitled to an earlier filing date.

### 4. *Csapo (Ex. 1006)*

Csapo is directed to base station transceiver subsystems used in a code division multiple access (CDMA) network or other digital and analog communication systems. Ex. 1006, 1:14–18. Csapo discloses a base station transceiver subsystem (BTS) with a radio unit (RU) located proximate to an antenna mounting location. *Id.* at 3:41–43. A main unit (MU) is connected to the RU and remotely located from the RU, where a plurality of RUs can be connected to a single MU. *Id.* at 3:43–46.

### 5. *Analysis*

Petitioner contends that claims 1–16 of the '916 patent are unpatentable under 35 U.S.C. § 103 as obvious over Ahy and Csapo. Pet. 13–47. Petitioner contends that claims 1–3, 6, 8–10, and 13 of the '810 patent are unpatentable under 35 U.S.C. § 103 as obvious over Ahy and Csapo. 1887 Pet. 13–37.

The preambles of claim 1 of the '916 patent and claim 1 of the '810 patent recite “[f]or use in a fixed wireless access network comprising a plurality of base stations performing bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality



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of subscriber premises.” Petitioner contends that Ahy discloses the preamble. Pet. 13–15 (citing Ex. 1003 ¶¶ 106–113).<sup>10</sup> Petitioner contends that Ahy discloses a system that includes a communication cell, a base station controller (BSC), and customer premises equipment (CPE). *Id.* at 13–14 (citing Ex. 1004, 5:52–56, Fig. 1). Petitioner argues that Ahy discloses that a sector is a portion of a cell, and the BSC is disposed in one corner of the cell, whereas the CPE are disposed within the sector. *Id.* (citing Ex. 1004, 6:1–6, Fig. 1). Petitioner further argues that Ahy discloses “a plurality of base stations and corresponding cells.” *Id.* at 14–15 (citing Ex. 1004, 6:9–20, Fig. 2; Ex. 1003 ¶ 108). Petitioner further contends that Ahy discloses both fixed and wireless communications systems, where in a fixed communication system the CPE does not move relative to the BSC. *Id.* at 15 (citing Ex. 1004, 16:42–47). According to Petitioner, Ahy further discloses “[c]ommunication between the BSC 120 and each CPE 130 is conducted using a TDD technique, in which time durations are divided into repeated individual frames, each one of which includes a ‘downstream’ portion and an ‘upstream’ portion.” *Id.* (quoting Ex. 1004, 1–7; citing Ex. 1003 ¶ 109).

Claim 1 of the ’916 patent and claim 1 of the ’810 patent also recite “a radio frequency (RF) modem shelf.” Petitioner contends that Csapo

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<sup>10</sup> Claim 1 of the ’916 patent and claim 1 of the ’810 include substantially similar recitations, and Petitioner has presented substantially similar arguments in IPR2017-01885 and IPR2017-01887. Although our citations are to IPR2017-01885, IPR2017-01887 includes the same citations to the Ahy and Csapo. Deviations between IPR2017-01885 and IPR2017-01887 are identified with the same citation format identified above, where citations to IPR2017-01887 are preceded by “1887.”

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discloses an RF modem shelf.<sup>11</sup> *Id.* at 16 (citing Ex. 1003 ¶¶ 111, 115). Petitioner argues that Csapo discloses a system that includes mobile subscribers or mobile stations and one or more base stations. *Id.* (citing Ex. 1006, 1:48–63). Petitioner further argues that Csapo discloses the structural components of a BSC to include a plurality of transceivers, modem processors, and a controller, and these functional blocks “are contained in one physical cabinet or housing which is in close proximity to a pole (or tower) 82 at ground level.” *Id.* (quoting Ex. 1006, 2:10–13; citing Ex. 1006, 1:66–2:3, Figs. 4–5).

Claim 1 of the ’916 patent and claim 1 of the ’810 patent further recite “a first RF modem communicating with a plurality of said wireless access devices using TDD frames, each TDD frame having an uplink for receiving data and a downlink for transmitting data.” Petitioner argues that the combination of Ahy and Csapo discloses this limitation. Pet. 20–21 (citing Ex. 1003 ¶¶ 125–126, 136); 1887 Pet. 19–21 (citing 1887 Ex. 1003 ¶¶ 60–65, 127–130). As discussed above, Petitioner argues that Ahy discloses that the BSC communicates with the CPE using a TDD technique. *Id.* (citing Ex. 1004, 7:1–5). Petitioner argues that each frame includes a downstream

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<sup>11</sup> Petitioner argues that although Ahy does not expressly disclose an RF modem shelf, “a POSITA at the time ’916 Patent [and ’810 Patent] was filed would have recognized the necessary inclusion of an RF modem and an RF modem shelf with the point to multipoint wireless communication system of Ahy.” Pet. 15–16 (citing Ex. 1003 ¶ 111). In other words, Petitioner asserts that the inclusion of an RF modem shelf is inherent based on the disclosure of Ahy. However, Petitioner further provides evidence that Csapo discloses an RF modem shelf. *See* Pet. 16. Accordingly, based on this record, we determine that Petitioner has met its burden based on the evidence disclosed by Csapo, and we need not determine whether an RF modem shelf is inherently disclosed by Ahy.

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portion or downlink, where the BSC sends information to one or more CPE, and an upstream portion or uplink, where the BSC receives information from one or more CPE. *Id.* (citing Ex. 1004, 7:10–14, Fig. 11). Petitioner further contends that Csapo expressly discloses an RF modem, as discussed above, where Csapo discloses the structural components of a BSC to include a plurality of transceivers, modem processors, and a controller, and these functional blocks “are contained in one physical cabinet or housing which is in close proximity to a pole (or tower) 82 at ground level.” *Id.* at 16 (quoting Ex. 1006, 2:10–13; citing Ex. 1006, 1:66–2:3, Figs. 4–5).

Claim 1 of the ’916 patent and claim 1 of the ’810 patent additionally recite “a modulation controller associated with said RF modem shelf determining an optimum modulation configuration for each of said plurality of wireless access devices communicating with said first RF modem.” Petitioner argues that Ahy discloses this limitation. *Id.* at 22–24 (citing Ex. 1003 ¶¶ 138–140); 1887 Pet. 22–24 (citing 1887 Ex. 1003 ¶¶ 142–145). Petitioner argues that Ahy discloses that the BSC “adaptively modifies ‘a set of communication parameters’ including parameters for ‘a wireless physical (PHY) layer’ in support of ‘communication with a plurality of customer premises equipment (CPE).”” *Id.* at 22 (quoting Ex. 1004, 2:15–20). Petitioner asserts that Ahy discloses that the BSC “‘maintains a set of the physical (PHY) parameters and media-access-control (MAC) parameters for each CPE’” (Pet. 22 (quoting Ex. 1004, 7:18–22)), and Mr. Proctor, Petitioner’s expert, explains that the “set of parameters (or a subset of the parameters) related to the PHY and/or MAC layer comprise a modulation configuration.” Ex. 1003 ¶ 138; Pet. 22; 1887 ¶ 142. Petitioner further argues that Ahy discloses that the BSC controls the modulation

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configuration in order to optimize the communication link, which may be imposed by higher levels in the OSI model. Pet. 23–24 (citing Ex. 1004, 2:36–39, 8:8–16, 10:49–51, 11:5–8, 11:56–57).

Claim 1 of the '916 patent also recites “said modulation controller causes said first RF modem to transmit downlink data to a first wireless access device in a first data block within a TDD frame using a first modulation configuration” and claim 1 of the '810 patent recites “said modulation controller causes said first RF modem to transmit first downlink data to a first wireless access device in a first data block having a first optimum modulation configuration.”

Petitioner argues that Ahy discloses these limitations. *Id.* at 24–25 (citing Ex. 1003 ¶¶ 152–154); 1887 Pet. 24–25 (citing 1887 Ex. 1003 ¶¶ 158–159). Petitioner argues that Ahy discloses that “[e]ach data block (i.e., downstream payload element) is ‘sent by the BSC’ and is destined ‘to a selected CPE.’” *Id.* at 25 (quoting Ex. 1004, 15:24–25). Mr. Proctor explains that each TDD frame includes parameter setting values that convey the communication parameters to be used by the BSC and the selected CPE. Ex. 1003 ¶ 153 (citing Ex. 1004, 15:14–20); Pet. 25. Petitioner further contends that the “communication parameters used to communicate with a particular CPE in the current TDD frame are specific to that CPE and frame and are conveyed to the CPE within the current frame.” Pet. 25 (citing Ex. 1004, 14:31–51, 16:1–19). Petitioner argues that the “BSC uses the parameter setting values to inform each selected CPE individually and separately of [] the PHY and MAC parameters the BSC is using to send

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messages to that selected CPR.” 1887 Pet. 25 (quoting 1887 Ex. 1004, 15:14–20) (numerals omitted).

Claim 1 of the ’916 patent additionally recites the modulation controller causes the RF modem “to transmit downlink data to a second wireless access device in a second data block within said TDD frame using a different second modulation configuration.” Petitioner argues that Ahy discloses this limitation. Pet. 25–29 (citing Ex. 1003 ¶¶ 160–165). As discussed above, Petitioner argues that Ahy discloses that “[e]ach data block (i.e., downstream payload element) is ‘sent by the BSC’ and is destined ‘to a selected CPE.’” *Id.* at 25, 27–28 (quoting Ex. 1004, 15:24–25). Mr. Proctor explains that each TDD frame includes parameter setting values that convey the communication parameters to be used by the BSC and the selected CPE. Ex. 1003 ¶ 153 (citing Ex. 1004, 15:14–20); Pet. 25, 28. As also discussed above, Petitioner further contends that the “communication parameters used to communicate with a particular CPE in the current TDD frame are specific to that CPE and frame and are conveyed to the CPE within the current frame.” Pet. 25, 28 (citing Ex. 1004, 14:31–51, 16:1–19). Mr. Proctor explains that the “parameters for each CPE are included in a ‘time synchronization portion’ (i.e., header portion) of a TDD frame and a downstream payload element is transmitted to each CPE in the downstream portion,” and, thus, “Ahy teaches a BSC which selects multiple CPE for transmission in a TDD frame and determines the PHY and MAC parameters to use in communicating with each CPE.” Ex. 1003 ¶ 165; Pet. 28–29.

Claim 1 of the ’810 patent similarly recites the modulation controller causes the RF modem “to transmit second downlink data to said first wireless access device in a second data block having a different second

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optimum modulation configuration.” Petitioner argues that Ahy discloses this limitation. 1887 Pet. 25–28 (citing 18887 Ex. 1003 ¶¶ 169–170, 174, 111). As discussed above, Petitioner argues that Ahy discloses the transmission of a “first data block from the BSC to a CPE using a first optimum modulation configuration.” Petitioner further argues that Ahy discloses a “a wireless physical (PHY) layer and a wireless media-access-control (MAC) layer collectively include a set of communication parameters, each of which is adaptively modified by a base station controller (BSC) for communication with a plurality of customer premises equipment,” and the “BSC adjusts communication with each CPE individually and adaptively in response to changes in communication characteristics.” *Id.* at 26 (quoting 1887 Ex. 1004, 2:15–22) (emphasis omitted).

Petitioner asserts that it would have been obvious to a person with ordinary skill in the art to combine Ahy’s disclosure of an adaptive point to multipoint communication system with Csapo’s disclosure of specific hardware associated with a base station transceiver system for two reasons. Pet. 17–18; 1887 Pet. 17–19. First, Petitioner argues that the combination of Ahy and Csapo would have amounted to nothing more than the use of a known technique to improve similar methods in the same way or is a combination of known prior art elements according to known methods that would yield nothing more than predictable results. *Id.* Petitioner argues that “a POSITA would have been motivated to pursue this combination because it would have yielded predictable results.” *Id.* at 18 (citing Ex. 1003 ¶ 119).

Second, Petitioner argues that the combination Ahy and Csapo would have been obvious to try. *Id.* at 18–19. Specifically, Petitioner argues that

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Ahy and Csapo disclose base stations that include similar equipment, such as a controller, processor, and transceivers. *Id.* Petitioner argues that a “POSITA would have . . . further recognized that Ahy’s broad description of the equipment comprising the BSC (processor, program and data memory, mass storage, and one or more antennas) would encompass the equipment disclosed by Csapo as being part of the BTS.” *Id.* at 19; 1887 Pet. 19 (citing 1887 Ex. 1003 ¶ 124).

We are persuaded by Petitioner’s arguments and evidence, and are persuaded by Petitioner that claim 1 of the ’916 patent and claim 1 of the ’810 patent are unpatentable over Ahy and Csapo. Pet. 13–29; 1887 Pet. 13–28. Petitioner presents a similar analysis with respect to claims 2–16 of the ’916 patent and claims 2,3, 6, 8–10, and 13 of the ’810 patent, and we similarly are persuaded these claims are unpatentable over Ahy and Csapo, notwithstanding Patent Owner’s arguments as to dependent claims 8 and 16, which we address below. Pet. 29–47; 1887 Pet. 28–37.

As per dependent claims 8 and 16, Patent Owner argues that Ahy fails to disclose “said first modulation configuration comprises a first physical beam forming technique and said second modulation configuration comprises a different second physical beam forming technique.” PO Resp. 35–37. Patent Owner specifically argues that Petitioner relies on Ahy’s disclosure of “antenna diversity selection parameter” as disclosing “beam forming,” but a person with ordinary skill in the art would not understand “antenna selection” to be the same as “beam forming. *Id.* at 36–37. Patent Owner asserts that “[b]eam forming’ requires some exchange of information between the base station and the subscriber to determine optimal settings for an antenna, including its signal characteristics,” whereas

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“antenna selection” involves redundant transmission over multiple antennas to increase signal-to-noise ratio or basic spatial multiplexing. *Id.* at 36 (citing Ex. 2477 ¶¶ 30, 32).

Petitioner responds that Patent Owner’s construction of “beam forming” is overly narrow, and “beam forming” technique is “just a modulation configuration.” Pet. Reply 24–25 (quoting Ex. 1015, 65:14–17). Petitioner argues that Ahy discloses “beam forming.” Pet. Reply 24–25 (citing Pet. 41–43). Petitioner further responds that Ahy discloses an “antenna selection” parameter, which “includes a choice of which one antenna at the BSC 120 and which one antenna at each CPE 130.” *Id.* at 25 (quoting Ex. 1004, 8:56–59; citing Ex. 1003 ¶ 233). “[T]he antenna selection parameter allows the BSC 120 to optimize a communication link with a selected CPE 130 in response to both interference effects and multipath effects.” *Id.* (quoting Ex. 1004, 8:60–63; citing Ex. 1003 ¶ 233).

We agree with Petitioner. Patent Owner does not rely on the ’916 patent specification in its construction. Rather, Patent Owner only supports its narrow claim construction with the testimony of Mr. Kurt Humphrey. PO Resp. 35–37 (citing Ex. 2477 ¶¶ 28–33). However, as argued by Petitioner, Mr. Humphrey during deposition explains that a “beam forming technique,” in the context of claims 8 and 16 of the ’916 patent, is just a “modulation configuration.” Pet. Reply 25 (citing Ex. 1015, 65:14–17); *see* Ex. 1015, 66:18–21. Ahy discloses that the base station controller and customer premises equipment each include one or more antennas, and the antenna selection parameter allows for the selection of the antennas to be used for transmission at the base station controller and at the customer equipment premises. Ex. 1004, 8:54–63. The antenna selection parameter allows the



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base station controller to optimize a communication link with the customer premises equipment. *Id.* at 8:62–9:2. We credit the testimony of Petitioner’s expert, Mr. James A. Proctor, who explains that the “[s]election of different sets or combinations of antennas will result in different coverage patterns and similarly constitutes use of different ‘physical beam forming techniques.’” Ex. 1003 ¶ 234. As such, we are persuaded that Ahy discloses “beam forming,” and further discloses the limitations set forth in claims 8 and 16 of the ’916 patent.

Patent Owner also does not present any additional arguments that the challenged claims are not unpatentable over the combination of Ahy and Csapo to persuade us otherwise. Tr. 35:18–36:6.

Based on the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–16 of the ’916 patent and claims 1–3, 6, 8–10, and 13 of the ’810 patent are unpatentable. Pet. 13–47; 1887 Pet. 13–37.

*D. Obviousness of claims 2–7 and 9–14 of the ’810 patent over Ahy, Csapo, and Sanders*

1. Petitioner contends that claims 2–7 and 9–14 of the ’810 patent are unpatentable under 35 U.S.C. § 103 as obvious over Ahy, Csapo, and Sanders. 1887 Pet. 37–47. *Priority date of the challenged claims of the ’810 patent with respect to Ahy*

As discussed above, we determine that Patent Owner arguments, absent improperly incorporating Exhibit 2457 in to its Response, are insufficient to establish conception prior to the filing date of Ahy. *See* Section II.C.2. As also discussed above, we determine that Patent Owner has not established conception of “determining an optimum modulation configuration,” as recited by independent claims 1 and 8 of the ’810 patent,

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prior to Ahy. *Id.* Claims 2–7 and 9–14 of the ’810 patent incorporate this feature by their dependency on independent claims 1 and 8 of the ’810 patent. As such, Ahy qualifies as prior art with respect to claims 2–7 and 9–14 of the ’810 patent for the same reasons discussed above. *See* Section II.C.2.

### 2. *Sanders (1887 Ex. 1006)*

Sanders is directed to proposed amendments to IEEE 802.16 physical layer (PHY) protocol that will allow for a Bandwidth-On-Demand MAC/PHY Sublayer within the 802.16.1 Broadband Wireless Access Air Interface Standard. 1887 Ex. 1006, 3. Areas of improvement based on the proposed amendments include Quality of Service (QoS) attributes, error control that is tailored to specific service classes, and improved use of available system bandwidth. *Id.*

### 3. *Analysis*

Petitioner contends that claims 2–7 and 9–14 of the ’810 patent are unpatentable under 35 U.S.C. § 103 as obvious over Ahy, Csapo, and Sanders. 1887 Pet. 37–47. Claim 2 recites “[t]he RF modem shelf as set forth in claim 1 wherein said modulation controller determines said first and second optimum modulation configurations based on [] channel conditions associated with a first channel used to communicate with said first wireless access device.” Petitioner contends that Ahy discloses this limitation. *Id.* at 29–30 (citing 1887 Ex. 1003 ¶¶ 184–186). Petitioner argues that Ahy discloses that “control of each parameter by the BSC is independent and individual with regard to each CPE,” and “the communication parameters which are chosen for each CPE account for the communication link with the CPE.” *Id.* at 29 (quoting 1887 Ex. 1004, 7:18–22 (numerals omitted); citing

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1887 Ex. 1004, 2:36–39, 10:49–51, 11:5–8, 11:56–57; Ex. 1003 ¶ 184).

Petitioner asserts that Ahy further discloses communication parameters are adaptively modified based on communication characteristics, which includes physical characteristics, such as bit-error-rate, and received signal strength, measured by the ratio of signal to interference or noise. *Id.* at 29–30 (citing 1887 Ex. 1004, 2:28–29, 10:58–67, 11:60–67, Figs. 6, 8). Mr. Proctor explains that a person with ordinary skill in the art would understand that physical characteristics and received signal strength are indicative of channel conditions for a communication link. 1887 Ex. 1003 ¶¶ 185–186.

Claim 2 further recites “a first service type associated with said first downlink data and a second service type associated with said second downlink data.” Petitioner contends that Sanders discloses this limitation. 1887 Pet. 37–38. Petitioner argues that Sanders discloses “physical layer modifications which enable improvement in quality of service (QoS) provided to network connections,” which includes “‘improved Quality of Service (QoS) attributes,’ ‘error control that is tailored to specific services classes,’ and ‘very efficient use of available bandwidth.’” *Id.* at 38 (quoting 1887 Ex. 1006, 3). According to Petitioner, Sanders discloses using time division multiplexing (TDM) frames that include a partition for “traffic channels” based on traffic type or QoS, and flexible modulation, randomization of payload, and programmable Forward Error Correction (FEC) is supported by each cell slot within a partition. *Id.* (citing 1887 Ex. 1006, 5, 8).

Petitioner asserts that it would have been obvious to a person with ordinary skill in the art to combine Sanders’s disclosure of flexible communication parameters allocated according to class of service with

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Ahy's and Csapo's disclosure of modulation control (BSC). *Id.* at 39–40. First, Petitioner argues that the combination of Sanders with Ahy and Csapo would have amounted to nothing more than the use of a known technique to improve similar methods in the same way or is a combination of known prior art elements according to known methods that would yield nothing more than predictable results. *Id.* at 39–40. Petitioner argues that “a POSITA would have been motivated to pursue this combination because it would have yielded predictable results.” *Id.* at 40.

Second, Petitioner argues that combination of Sanders with Ahy and Csapo would have been obvious to try. *Id.* at 40. Specifically, Petitioner argues that Ahy, Csapo, and Sanders are directed towards “improving wireless transmission between a base station and multiple wireless access devices through adaptation of the communication parameters.” *Id.* (citing 1887 Ex. 1003 ¶ 208; 1887 Ex. 1004, 1:56–2:14; 1887 Ex. 1006, 3). Petitioner further argues that Ahy, Csapo, and Sanders “provide a flexible MAC/PHY layer which can support a variety of higher layer protocols and is adaptable according to higher-layer requirements.” *Id.* (citing 1887 Ex. 1003 ¶ 208; 1887 Ex. 1004, 2:26–31, 8:8–16; 1887 Ex. 1006, 3).

We are persuaded by Petitioner's arguments and evidence, and are persuaded by Petitioner that claim 2 of the '810 patent is unpatentable over Ahy and Csapo. 1887 Pet. 37–40. Petitioner presents a detailed analysis with respect to claims 3–7 and 9–14 of the '810 patent, and we similarly are persuaded these claims are unpatentable over Ahy and Csapo. 1887 Pet. 40–47.

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Patent Owner also does not present any arguments that the challenged claims are not unpatentable over the combination of Ahy and Csapo to persuade us otherwise. Tr. 35:18–36:6.

Based on the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 2–7 and 9–14 of the '810 patent are unpatentable. 1887 Pet. 40–47.

*E. Obviousness of claims 1–16 of the '916 patent and claims 1 and 8 of the '810 patent over Klein and the knowledge of a person with ordinary skill in the art, and claims 2–7 and 9–14 of the '810 patent over Klein, a person with ordinary skill in the art, and Sanders*

Petitioner contends that claims 1–16 of the '916 patent are unpatentable under 35 U.S.C. § 103 as obvious over Klein<sup>12</sup> and the knowledge of a person of ordinary skill in the art. Pet. 47–65. Petitioner contends that claims 1 and 8 of the '810 patent are unpatentable under 35 U.S.C. § 103 as obvious over Klein and the knowledge of a person of ordinary skill in the art. 1887 Pet. 47–55. Petitioner contends that claims 2–7 and 9–14 of the '810 patent are unpatentable under 35 U.S.C. § 103 as obvious over Klein, the knowledge of a person of ordinary skill in the art, and Sanders. 1887 Pet. 55–64.

As discussed above, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–16 of the '916 patent and claims 1–14 of the '810 patent are unpatentable. Accordingly, we need not reach these additional grounds asserted by Petitioner.

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<sup>12</sup> Klein et al., “PHY Layer Proposal for BWA”, IEEE 802.16, January 5, 2000 (Ex. 1005, “Klein”).

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### III. PETITIONER’S MOTION TO EXCLUDE

Petitioner moves to exclude “weekly reports,” filed by Patent Owner as Exhibits 2002–2003, 2005, 2007–2009, 2017, 2022, 2024, 2026–2050, 2052–2055, 2061–2063, 2065–2397, and 2399–2450 as inadmissible hearsay. Pet. MTE 1. We have not relied on any of these exhibits in our Decision. Accordingly, Petitioner’s motion to exclude Exhibits 2002–2003, 2005, 2007–2009, 2017, 2022, 2024, 2026–2050, 2052–2055, 2061–2063, 2065–2397, and 2399–2450 is dismissed as moot.

Petitioner also moves to exclude the testimony of Kirk Griffin, which is filed by Patent Owner as Exhibit 2001. *Id.* Petitioner argues that “the majority of Exhibit 2001 is inadmissible because the declarant, Kirk Griffin, lacks personal knowledge of any of the ‘facts’ to which he attests.” *Id.* Petitioner’s argument goes to the weight given to the evidence asserted by Patent Owner, not towards its admissibility. Thus, Petitioner’s argument is not a proper basis for a motion to exclude. Accordingly, Petitioner’s motion to exclude Exhibit 2001 is denied.

### IV. PATENT OWNER’S MOTION TO STRIKE

Patent Owner moves to strike Exhibits 1009 and 1031, and portions of Petitioner’s Reply that relies on these exhibits from the record on the grounds that they introduce new evidence and arguments that exceed the proper scope of a reply. PO MTS 1. We, however, have not relied on Exhibits 1009, 1031, and the portions of Petitioner’s Reply that relies on these exhibits in our Decision. Accordingly, Patent Owner’s motion to strike Exhibits 1009 and 1031, and portions of Petitioner’s Reply is dismissed as moot.

IPR2017-01885 (Patent 7,173,916 B2)

IPR2017-01887 (Patent 6,891,810 B2)

## V. CONCLUSION

Petitioner has shown, by a preponderance of the evidence, that claims 1–16 of the '916 patent and claims 1–14 of the '810 patent are unpatentable. Petitioner's Motion to Exclude is dismissed as moot in part, and denied in part. Patent Owner's Motion to Strike is dismissed as moot.

## VI. ORDER

After due consideration of the record before us, and for the foregoing reasons, it is:

ORDERED that claims 1–16 of the '916 patent and claims 1–14 of the '810 patent are held unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude is dismissed as moot in part, and denied in part;

FURTHER ORDERED Patent Owner's Motion to Strike is dismissed as moot; and

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

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IPR2017-01887 (Patent 6,891,810 B2)

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