

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC.
NOKIA OF AMERICA CORPORATION,
Petitioner,

v.

XR COMMUNICATIONS LLC,
Patent Owner.

IPR2024-00868
Patent 8,737,511 B2

Before MICHAEL J. STRAUSS, NORMAN H. BEAMER,
and KARA L. SZPONDOWSKI, *Administrative Patent Judges*.

SZPONDOWSKI, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. *Background and Summary*

We instituted an *inter partes* review of claims 1, 2, 4–6, 9–11, 13–15, and 18–20 of U.S. Patent No. 8,737,511 B2 (Ex. 1001, the “’511 patent”), in response to a Petition (Paper 3, “Pet.”) filed by Ericsson Inc. and Nokia of America Corporation (“Petitioner”). Paper 8 (“Inst. Dec.”). XR Communications LLC (“Patent Owner”), filed a Response (Paper 14, “PO Resp.”), Petitioner filed a Reply (Paper 16, “Reply”), and Patent Owner filed a Sur-reply (Paper 18, “Sur-reply”).

We held an oral hearing in this proceeding on September 24, 2025, and a copy of the transcript is entered into the record. Paper 25 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. Petitioner has the burden of proving unpatentability of a claim by a preponderance of the evidence. 35 U.S.C. § 316(e).

Based on the complete record, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 4–6, 9–11, 13–15, and 18–20 of the ’511 patent are unpatentable.

B. *Real Parties-in-Interest*

Petitioner identifies themselves and Telefonaktiebolaget LM Ericsson as real parties-in-interest. Pet. 72. Petitioner “likewise identif[ies] T-Mobile USA, Inc., AT&T Services Inc., AT&T Mobility LLC, AT&T Corporation, and Cellco Partnership d/b/a Verizon Wireless” as real parties-in-interest “[t]o avoid additional issues associated with real parties in interest.” *Id.*

Patent Owner identifies itself, doing business as Vivato Technologies, as the sole real party-in-interest. Paper 4, 2 (Patent Owner Mandatory Notices).

C. Related Matters

The '511 patent is the subject of litigation in the U.S. District Court for the Eastern District of Texas, in cases styled *XR Communications LLC v. Verizon Communications, Inc.*, Case No. 2:23-cv-00203-JRG-RSP; *XR Communications LLC v. T-Mobile USA, Inc.*, Case No. 2:23-cv-00204-JRG-RSP; *XR Communications LLC v. AT&T Services Inc., AT&T Mobility LLC, and AT&T Corp.*, Case No. 2:23-cv-00202-JRG-RSP. Pet. 72; Paper 4, 2. These cases have been consolidated. See Ex. 3001. The parties further identify *XR Communications LLC v. Nokia of America Corp.*, Case No. 2:25-cv-00979-JRG-RSP, also in the Eastern District of Texas, as involving the '511 patent. *Id.*

D. The '511 Patent

The '511 patent, titled “Directed MIMO Communications,” issued May 27, 2014, from an application filed April 13, 2012. Ex. 1001, codes (54), (45), (22). The '511 patent is directed “to multiple-input multiple-output (MIMO) wireless communications and beam forming antennas.” *Id.* at 1:5–7. Figure 2, which shows an example of a block diagram of a receiver, is reproduced below.

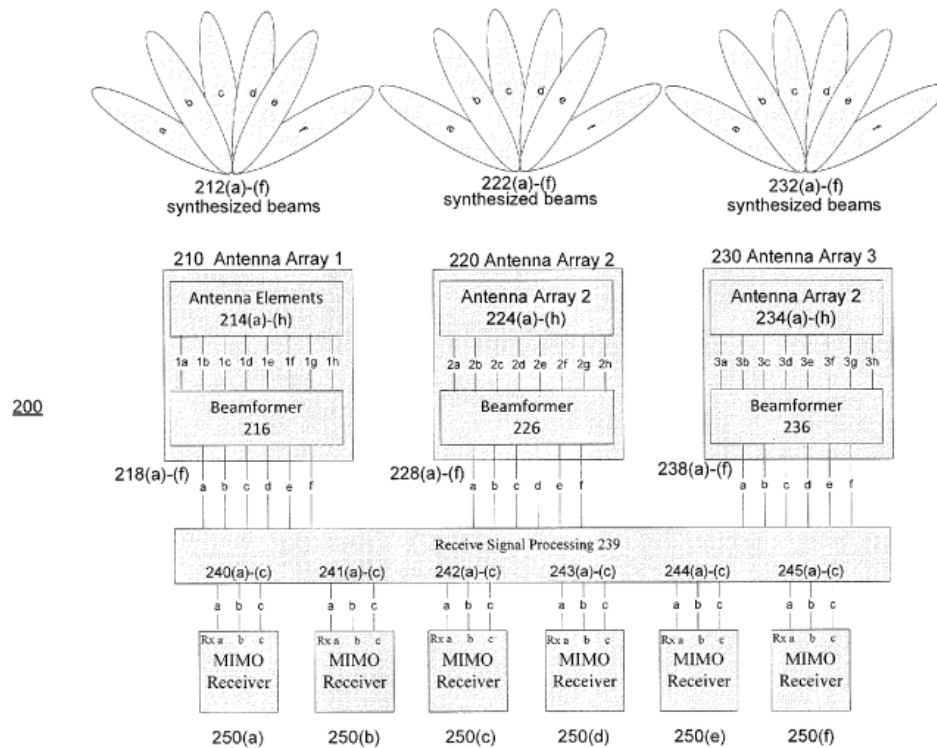


FIG. 2

Ex. 1001, 2:35. Figure 2 “depicts an example of block diagram of a receiver for extended communications range and throughput using MIMO and beam forming.” *Id.* at 2:38–40. In this example, which depicts only the receive portion of the transceiver, there are three antenna arrays, and each antenna array produces six independent beams 212(a)-(f), 222(a)-(f), and 232(a)-(f). *Id.* at 4:54–58. Antenna arrays 210, 220 and 230 include antenna elements 214(a)-(h), 224(a)-(h), and 234(a)-(h), and beamformers 216, 226, and 236. *Id.* at 4:58–67.

The beams of each antenna are associated with signals 218(a)-(f), 228(a)-(f), and 238(a)-(f), respectively. Ex. 1001, 5:1–2. “MIMO receivers 250(a), 250(b), 250(c), 250(d), 250(e) and 250(f) are connected to beamformers 216, 226, and 236 such that beamformer output 218(a) corresponding to beam 212(a) is connected to MIMO receiver 250(a) at

240(a).” *Id.* at 5:3–6. This configuration is repeated for the other beamformer outputs and MIMO transceivers. *Id.* at 5:6–22.

There are an equal number of MIMO receivers as beams per antenna array. For example, four antennas with three beams each could be connected to three MIMO receivers each with four inputs. Similarly, two antenna arrays with three beams each could be connected to three MIMO receivers with two inputs each. In some implementations, multiple MIMO receivers are implemented on a single circuit card and/or in a single enclosure. In some implementations, one MIMO receiver may be capable of handling multiple receive channels simultaneously.

Id. at 5:28–33.

E. Illustrative Claim

Claims 1, 10, 19, and 20 are independent claims. Independent claim 1 is representative of the claimed subject matter and is reproduced below with Petitioner’s and Patent Owner’s identifiers in brackets.

1. [1pre] A system comprising:
 - [1.a.i] m antenna arrays configured to receive a propagating radio frequency signal and configured to transmit a propagating radio frequency signal, each of the antenna arrays comprising:
 - [1a.ii] a plurality of antenna elements; and
 - [1a.iii] a beamformer configured to produce n different bi-directional beams using the plurality of antenna elements; and
 - [1b] n multiple-input multiple-output transceivers (MIMO), each MIMO transceiver comprising:
 - a MIMO receiver configured to process m different received signals, wherein an i-th received signal to a j-th MIMO receiver corresponds to a j-th beam of an i-th antenna array; and
 - a MIMO transmitter configured to process m different transmit signals, wherein a v-th transmit signal from a z-th MIMO transmitter corresponds to a z-th beam of a v-th antenna array,

[1c] wherein m , n , v , and z are integer number values, wherein $i=1, \dots, m$, $j=1, \dots, n$, and $v=1, \dots, m$, wherein $n \geq 2$ and $m \geq 2$, wherein $z=1, \dots, w$, and wherein $n \geq w \geq 2$.

Ex. 1001, 10:23–46. Independent claim 10 recites the same subject matter as claim 1, but in apparatus form. *Id.* at 11:1–25. Claim 19 recites similar subject matter as claim 10, but is directed to a MIMO receiver and omits the recitations directed at the MIMO transmitter. *Id.* at 12:9–22. Similarly, claim 20 recites similar subject matter as claim 10, but is directed to a MIMO transmitter and omits the recitations directed at the MIMO receiver. *Id.* at 12:23–37.

F. Prior Art and Asserted Grounds

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. § ¹	References/Basis
1, 2, 4–6, 9–11, 13–15, 18–20	103(a)	Trigui ²
4–6, 13–15, 18	103(a)	Trigui, Rudrapatna ³

Pet. 17–18. Petitioner relies on the declaration testimony of Dr. Kevin Negus to support its unpatentability contentions. Ex. 1003. Patent Owner relies on the Declaration of Dr. Todor Cooklev. Ex. 2003.

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 296–07 (2011), took effect on September 16, 2011. The changes to 35 U.S.C. §§ 102 and 103 in the AIA do not apply to any patent application filed before March 16, 2013. Because the application that matured into the ’511 patent was filed before March 16, 2013, we refer to the pre-AIA version of the statute.

² U.S. Pat. Pub. 2011/0150050, published June 23, 2011 (Ex. 1004, “Trigui”).

³ U.S. Pat. No. 6,801,790 B2, issued Oct. 5, 2004 (Ex. 1005, “Rudrapatna”).

Following is a brief description of the asserted prior art references.

1. *Trigui*

Trigui, titled “Digital Integrated Antenna Array for Enhancing Coverage and Capacity of a Wireless Network,” published June 23, 2011, from an application filed December 23, 2009. Ex. 1004, codes (54), (43), (22). Trigui “relates . . . to using a digital integrated antenna array for enhancing coverage and capacity of a wireless network, and enabling a versatile solution for sharing antenna elements and active electronics between multiple operators servicing the same geographic area.” *Id.* ¶ 2.

We reproduce Trigui’s Figure 2A, below.

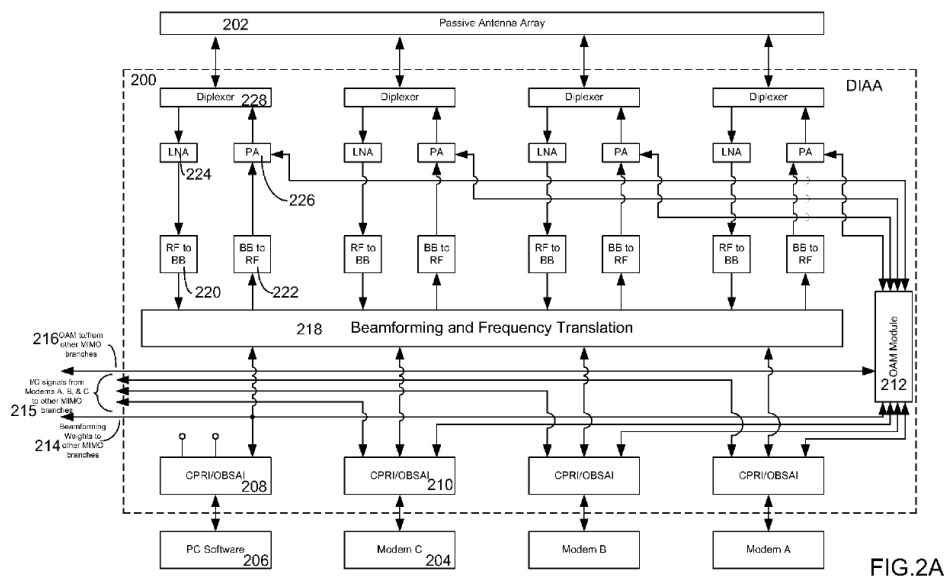


Figure 2A depicts “an exemplary high-level implementation of a single MIMO branch of a digital integrated antenna array [(“DIAA”)] system.” Ex. 1004 ¶ 23. When receiving signals, the signals are passed from passive array 202 to diplexer 228 then to low-noise amplifiers 224. *Id.* ¶ 46.

Circuit 220 converts output signals from amplifiers 224 from radio-frequency signals to baseband signals. *Id.* These signals are fed to beam forming and frequency translation module 218, where beam forming

and calibration weights are applied to the signals to convert the signals to modem signals. These modem signals are filtered and extracted, then passing through digital interface cores 208, 210 to modems 204 and interface 206. *Id.* This process is essentially reversed when transmitting signals. *See id.* ¶¶ 36–45; *see also id.* at Fig. 2B (providing additional detail concerning the system of Figure 2A).

“An exemplary implementation of a 2xN MIMO DIAA, essentially including multiples of the hardware of F[igures] 2A and 2B, is illustrated [in] F[igure] 6.” Ex. 1004 ¶ 36. Figure 6 is reproduced below:

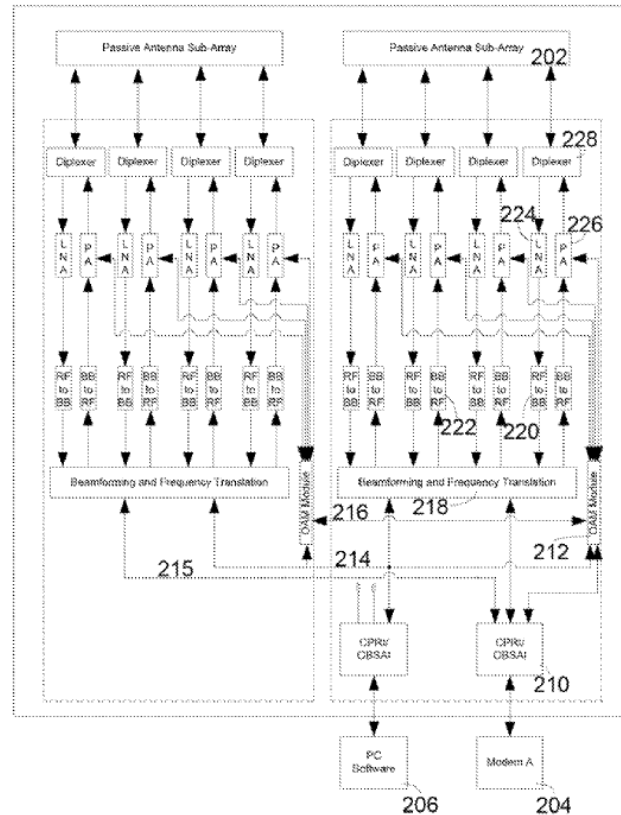


FIG.6

Figure 6 illustrates a 2xN MIMO DIAA system.

“[E]xemplary implementations of 4xN MIMO DIAAs, essentially including multiples of the hardware of F[igures] 2A and 2B, are illustrated

by F[igures] 7–11.” *Id.*; see Figs. 6, 10. Figure 10 is reproduced below:

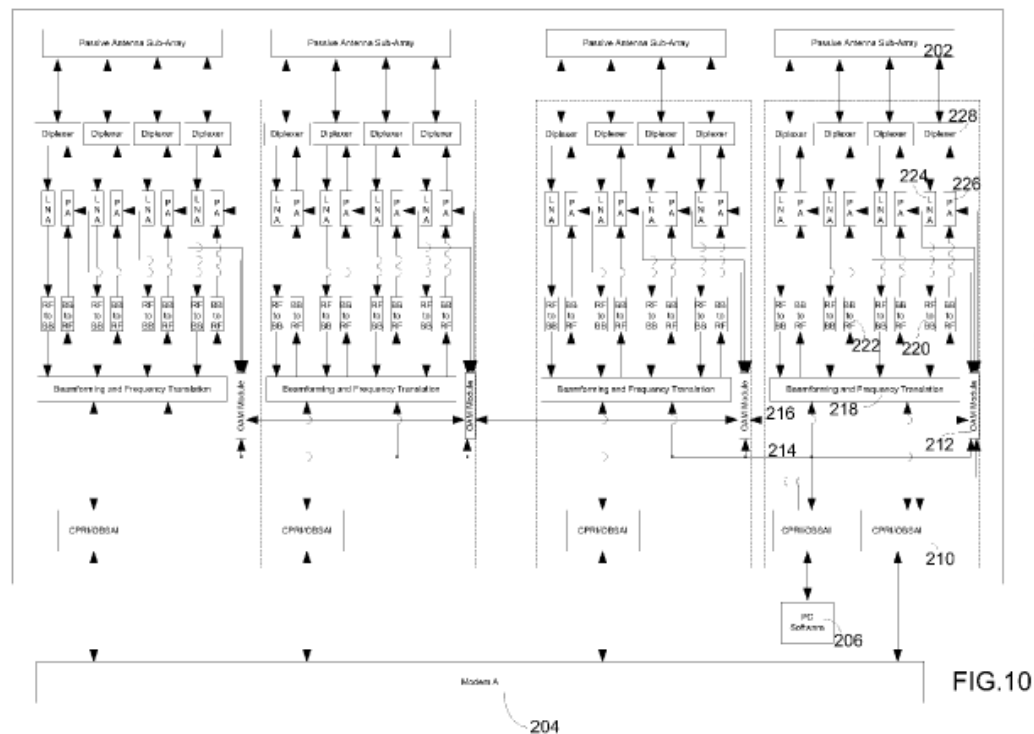


Figure 10 depicts a 4XN MIMO DIAA system. Trigui further states that “[i]n discussing a 2xN or a 4xN system DIAA, it should be noted that N is the number of transceivers at the subscriber station.” *Id.* ¶ 36.

2. Rudrapatna

Rudrapatna, titled “Structure for Multiple Antenna Configurations,” issued October 5, 2004, from an application filed January 17, 2001.

Ex. 1005, codes (22), (45), (54). Rudrapatna is directed “to [a] multiple antennasystem that can operate in either multiple input multiple output (MIMO) mode, a beam forming/steering mode or a diversity mode.” *Id.* at 1:7–10.

An antenna array comprising at least two groups of antennas where each group comprises at least two pairs of antennas. Each of the pairs in a group contains orthogonally polarized antennas and at least one antenna in a pair is similarly polarized to one antenna in at least another pair in the group. The

antenna array further comprises circuitry coupled to the antenna groups to select and activate certain antennas in a group to enable the antenna array to operate in either a beam forming/steering mode, a diversity mode or a MIMO mode or any combination thereof. The antennas in the groups are activated based on the characteristics of the signals being transmitted or received by the antenna array.

Ex. 1005, code (57).

II. ANALYSIS

A. *Legal Standards*

A claim is unpatentable under 35 U.S.C. § 103(a) if “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). 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. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In determining whether a claim is invalid as obvious, we compare the prior art to the claim language, and if necessary, after the claim language has been properly construed when the meaning or scope is in dispute.” *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1003 (Fed. Cir. 2023). In reaching this conclusion, the court must avoid “hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *KSR*, 550 U.S. at 421. A patent can be obvious in light of a single prior art reference if it

would have been obvious to modify that reference to arrive at the patented invention. *See, e.g., SIBIA Neurosciences, Inc. v. Cadus Pharm. Corp.*, 225 F.3d 1349, 1356 (Fed. Cir. 2000).

An obviousness determination based on a combination of references requires finding “both ‘that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016) (citation omitted). Further, an assertion of obviousness “cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418.

In an *inter partes* review, the petitioner bears the burden of persuasion to prove “unpatentability by a preponderance of the evidence.” *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (quoting 35 U.S.C. § 316(e)). This burden of persuasion never shifts to the patent owner. *Dynamic Drinkware*, 800 F.3d at 1378 (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–1327 (Fed. Cir. 2008)). Petitioner must explain with particularity how the prior art would have rendered the challenged claims unpatentable. 35 U.S.C. § 312(a)(3); 37 C.F.R. § 42.104(b)(4) (2024) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”).

B. Level of Ordinary Skill in the Art

Petitioner contends that a person having ordinary skill in the art “would have had at least a Bachelor’s degree in Electrical Engineering or a

related field and at least two years of professional experience in developing MIMO-based wireless communications products.” Pet. 14 (referencing Ex. 1003 ¶¶ 24–25). Petitioner contends, alternatively, that a person having ordinary skill in the art “could have had a more advanced degree, such as a Master’s degree in Electrical Engineering or an equivalent field, combined with at least one year of work experience in developing MIMO-based wireless communications products.” *Id.* (referencing Ex. 1003 ¶¶ 24–25).

Patent Owner does not challenge Petitioner’s characterization of the level of ordinary skill in the art, or provide an alternative level of ordinary skill in the art. PO Resp. 9.

In the Institution Decision, we adopted Petitioner’s proposed level of ordinary skill in the art, which was also undisputed by Patent Owner at that stage of the proceeding. Inst. Dec. 11–12. Because nothing in the record establishes that our preliminary finding in the Institution Decision was incorrect, and because there is no dispute, we maintain our adoption of Petitioner’s proposed level of ordinary skill in the art.

C. Claim Construction

Petitioner contends “[n]o specific construction of any term is required,” and Petitioner has applied the “ordinary and customary meaning” of the claim terms. Pet. 13–14.

Patent Owner states that, “[f]or purposes of this proceeding, Patent Owner agrees that no formal claim construction is necessary.” PO Resp. 9. Patent Owner provides the Board with the district court’s constructions in the related litigation. *Id.* (citing 2007, 39).⁴

⁴ The Petition in this case was filed on May 8, 2024. In the related litigation, Patent Owner’s opening brief on claim construction was filed on July 15, 2024, defendants’ responsive brief on claim construction was filed on

We agree with Petitioner and Patent Owner that, for the purposes of this Decision, we need not expressly construe any claim terms to resolve the parties' disputes. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those 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)). Accordingly, to the extent necessary, we apply the district court's constructions and the plain and ordinary meaning of the claim terms. To the extent that the scope of any particular claim term requires discussion, we provide it in our assessment of the challenges.

D. Ground 1: Claims 1, 2, 4–6, 9–11, 13–15, and 18–20 as unpatentable over Trigui

Petitioner contends that Trigui teaches or suggests each limitation of claims 1, 2, 4–6, 9–11, 13–15, and 18–20. Pet. 18, 22–60. Patent Owner disputes Petitioner's contentions, arguing that Trigui does not teach the limitations recited in independent claim 1. PO Resp. 14–27; Sur-reply 3–12.

After reviewing the record developed at trial, we determine that Petitioner has shown by a preponderance of the evidence that claim 1 would have been obvious over Trigui. Petitioner's contentions, Patent Owner's arguments, and our analysis are set forth below.

August 12, 2024, and the Markman hearing was held on September 11, 2024, and the claim construction order was entered on November 14, 2024. *XR Communications LLC v. AT&T Services Inc.*, Case No. 2:23-cv-00202-JRG-RSP, Dkt. Nos. 81, 86, 90, 99.

1. Independent Claim 1

a) Petitioner's Contentions for Limitation [1a]

i. Limitation [1a.i]

Claim 1 recites “[a] system comprising: m antenna arrays configured to receive a propagating radio frequency signal and configured to transmit a propagating radio frequency signal . . . wherein m . . . [is an] integer number, . . . and $m \geq 2$.” Ex. 1001, 10:23–44 (limitations [1a.i], [1c]). Petitioner contends that Trigui’s Figure 6 depicts a single antenna array having two beams, and Figure 10 replicates Figure 6 twice, depicting two antenna arrays, each of which has two beams. Pet. 28; *see id.* at 28–30 (explaining how Trigui’s Figure 10 teaches the “m” antenna arrays, with $m=2$); Ex. 1004 ¶¶ 81 (discussing Figure 6), 81–86 (discussing Figures 7–11); Ex. 1003 ¶¶ 194–198 (discussing Trigui’s Figure 10).

ii. Limitation [1a.ii]

Claim 1 also recites that each of the m antenna arrays comprise “a plurality of antenna elements.” Ex. 1001, 10:28 (limitation [1a.ii]). Petitioner contends that Trigui’s Figure 2A depicts “a DIAA which ‘represents a single MIMO branch of a DIAA system’ and includes a ‘passive antenna array 202.’” Pet. 23 (referencing Ex. 1004 ¶¶ 36, 36; Ex. 1003 ¶¶ 180–181). Petitioner adds that “Trigui . . . explains that the antenna arrays may consist of ‘sub-arrays’ where ‘the antenna elements of each sub-array are combined passively to achieve a predefined pattern,’” and that in this arrangement “the antenna array elements are closely spaced to avoid grating lobes when steering a beam off boresight direction.” *Id.* at 24 (referencing Ex. 1004 ¶ 50; Ex. 1003 ¶ 185). Petitioner contends that, from this description, a person having ordinary skill in the art would have

understood that Trigui's antenna arrays include a plurality of antenna elements as recited in limitation [1a.ii]. *Id.*

iii. Limitation [1a.iii]

Claim 1 also recites that each of the *m* antenna arrays comprise “a beamformer configured to produce *n* different bi-directional beams using the plurality of antenna elements . . . wherein *n* . . . [is an] integer . . . [and] wherein $n \geq 2$.” Ex. 1001, 10:29–44 (limitations [1a.iii], [1c]). Petitioner contends that Trigui discloses that the DIAA receives beamforming weights 214. Pet. 25 (referencing Ex. 1004 ¶ 38). Petitioner explains that, during signal transmission, “signals from modems 204 are transmitted to a beamforming and frequency translation module 218, where they are ‘multiplied by the beamforming and calibration weights such that when applied to the passive antenna array 202.’” *Id.* (quoting Ex. 1004 ¶ 44). Petitioner contends that resulting radiation patterns may have one or more subsector patterns, such that the beams are bi-directional. *Id.* (referencing Ex. 1004 ¶ 44; Ex. 1003 ¶¶ 182–183).

Petitioner contends that, when receiving transmissions, the signals are passed from the antenna array to the beamforming and frequency translation module, where the weights are applied to form modem signals. Pet. 25 (referencing Ex. 1004 ¶ 46; Ex. 1003 ¶ 184). Petitioner contends that “the beams are ‘*bi-directional*’ because the same beams are used for transmit and receive because the same weights are applied for transmit and receive.” *Id.* at 26 (referencing Ex. 1004 ¶¶ 55, 77; Ex. 1003 ¶ 186).

Petitioner contends that “[e]ach of Trigui's arrays can produce multiple beams (*n* different bi-directional beams).” Pet. 26; *see id.* (providing an annotated version of Trigui's Figures 4A and 4B, identifying the multiple beams). Petitioner contends that Trigui's Figure 6 depicts a

system where “each of the ‘sub-arrays’ creates a bi-directional beam such that the array in Figure 6 generates 2 *different bidirectional beams* (‘n=2’).” *Id.* at 27; *see id.* (providing an annotated version of Trigui’s Figure 6, and identifying how the beamformers are configured to produce two different bi-directional beams). We reproduce Petitioner’s annotated version of Trigui’s Figure 6, below.

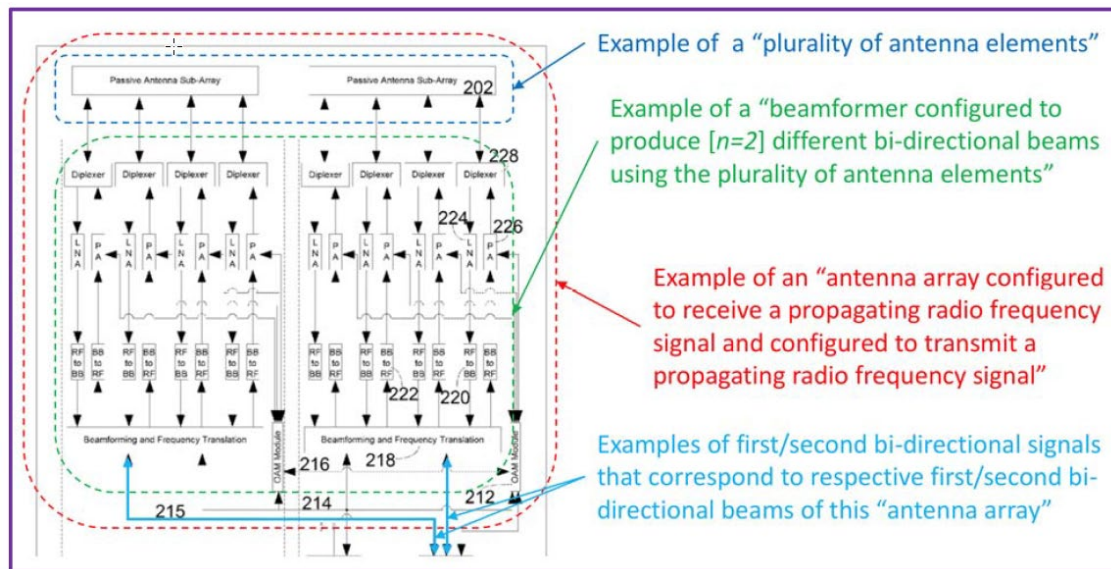


Figure 6 depicts a “two MIMO branches configured to provide a 2xN MIMO DIAA system.” Ex. 1004 ¶ 81. Petitioner’s annotation includes a dashed green box that Petitioner contends illustrates the beamformer. Petitioner also annotates the first and second bidirectional signals in blue, one each from the two beamforming and frequency translation modules 218. Pet. 27 (“Each MIMO transceiver branch has one beam for transmit and receive.” Ex-1004, [0077]. Thus, Figure 6 has two beams for transmit and receive.”); *see also* Ex. 1004 ¶¶ 9, 14, 74 (referenced at Pet. 27); Ex. 1003 ¶¶ 188, 193 (referenced at Pet. 27–28).

Petitioner, therefore, contends that Trigui’s Figure 6 shows a single antenna array with two beams. Pet. 28. Because Trigui’s Figure 10

replicates Figure 6, Petitioner contends that Figure 10 shows two antenna arrays each with two beams, i.e., $m=2$ and $n=2$. *Id.* at 28–30 (citing Ex. 1003 ¶¶ 196–199).

b) Patent Owner's Arguments for Limitation [1a]

Patent Owner argues that “Trigui does not teach any relationship between the number of beams and the number of MIMO transceivers.” PO Resp. 18 (citing Ex. 2003 ¶ 98). That is, “the number of beams produced by the array and beamformer is determined by the design of the array and beamformer.” *Id.* at 15; *see* Ex. 1001, 3:64–67 (“The number of beams produced by antenna arrays 130, 140 is a parameter determined by the design of the array”). According to Patent Owner, “[t]he mere fact that an array or beamformer has the capability to produce certain beams is insufficient, where the array and beamformer are not so configured.” *Id.* at 16; Sur-Reply 1. Therefore, Patent Owner argues, “Trigui’s antennas are not configured to produce n different bidirectional beams,” and Petitioner uses “hindsight to rewrite Trigui with the ‘right’ number of beams, arrays, and MIMO transceivers.” PO Resp. 16–17 (citing Ex. 2003 ¶ 93).

Patent Owner also argues that Trigui’s Figure 6 “shows two sub-arrays and at most one MIMO transceiver,” “does not show ‘a single antenna array with two beams’” and “Trigui’s subarrays are not intended to be combined.” PO Resp. 17–18 (citing Ex. 2003 ¶¶ 94, 96, 87); Sur-reply 4.

c) Analysis of Limitation [1a]

We determine that Petitioner has shown, by a preponderance of the evidence, that Trigui teaches limitation [1a]. As set forth above, limitation [1a] requires “ m ” antenna arrays, where each array comprises a beamformer configured to produce “ n ” different bi-directional beams. Trigui discloses Figure 2A, which is “an exemplary digital integrated antenna array system”

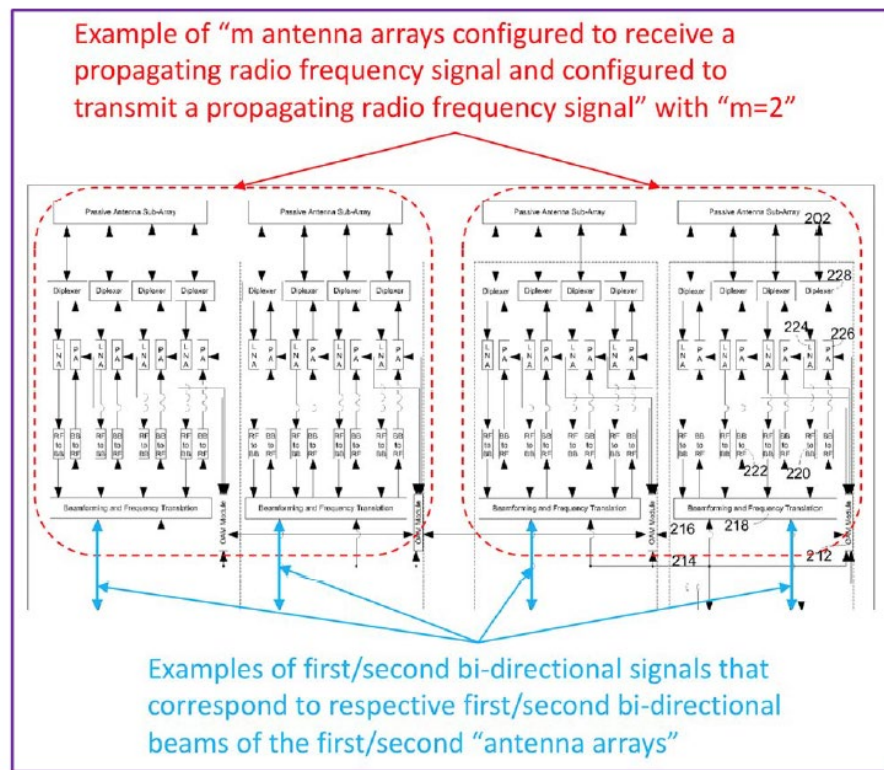
that “represents a single MIMO branch of a DIAA system.” Ex. 1004 ¶ 36. Figures 6 and 10 show multiples of the system of Figure 2A. *Id.*; *see also id.* ¶ 81 (describing Figure 6) ¶ 85 (describing Figure 10). We find persuasive Petitioner’s arguments that Trigui’s arrays may consist of “sub-arrays.” *See* Pet. 24; Reply 9. For example, Trigui describes that “[t]he antenna arrays 256 may consist of sub-arrays where the antenna elements of each sub-array are combined passively to achieve a predefined pattern.” Ex. 1004 ¶ 50. To that end, Figure 6 shows one antenna array that consists of two Passive Antenna Sub-arrays (i.e., the plurality of antenna elements), and Figure 10 shows two antenna arrays that each consist of two Passive Antenna Sub-arrays (i.e., the plurality of antenna elements). *See* Pet. 28–32; Reply 9–11. Given this disclosure in Trigui, we do not find persuasive Patent Owner’s arguments that Figure 6 does not show a single antenna array, or that Figure 10 does not show two antenna arrays. PO Resp. 17–18.

Patent Owner also argues that a person of ordinary skill in the art would understand that Trigui’s sub-arrays are not intended to be combined. PO Resp. 18. This argument contradicts Trigui’s disclosure, which shows multiples of the hardware of Figure 2A in Figures 6 and 10, and encourages multiple operator sharing of passive antenna arrays and transceivers. *See, e.g.*, Reply 4 (describing Trigui as “providing building blocks that should be combined to understand Trigui’s full teachings”); Ex. 1004 ¶¶ 48, 68. Trigui even states as much:

Although FIG 2A illustrates only a single MIMO branch DIAA, the present invention contemplates the use of multiple MIMO branches (as will be illustrated below with reference to FIGS. 6–11) . . . Similarly, I/Q signals 215 from any of the modems, as well as the beamforming weights 214, can be sent to other MIMO branches.

Ex. 1004 ¶ 41.

Patent Owner’s argument that “Trigui does not teach any relationship between the number of beams and the number of MIMO transceivers” is not well developed and is unpersuasive in light of Petitioner’s showing. Petitioner has demonstrated that Trigui’s Figure 6 depicts one antenna array with two bi-directional beams. Pet. 27–28. Petitioner has further demonstrated that Trigui’s Figure 10 depicts two antenna arrays, i.e., where $m=2$, where each array comprises a beamformer configured to produce n different bi-directional beams, i.e., where $n=2$. *Id.* at 28–29. Petitioner’s annotated Figure 10 is reproduced below:



Id. at 29. Petitioner’s annotated Figure 10 shows two copies of the arrangement shown in Figure 6, where Petitioner has identified in red the two antenna arrays, and identified in blue the beams. That is, Trigui’s Figure 10 shows two antenna arrays that each produce two beams.

We agree with Petitioner that Patent Owner's arguments regarding Figures 3 and 4 of Trigui (PO Resp. 16–17) do not address Petitioner's contentions. *See* Reply 6–7. Petitioner relies on Figures 4A and 4B to support that “[e]ach of Trigui's arrays can produce multiple beams.” Pet. 26; Reply 7. Dr. Cooklev agrees. PO Resp. 16 (citing Ex. 2003 ¶ 91). However, as described above, Petitioner relies on Figure 6 to show “n” different bidirectional beams where $n=2$. Pet. 27. Petitioner does not rely on Figures 3 and 4 to teach the “n” number of beams. *See* Reply 7. Accordingly, we do not agree with Patent Owner's argument that the Petition provides no evidence for the “n different bidirectional beams.” *See* Sur-reply 11–12; *see* Pet. 27 (citing Ex. 1004 ¶¶ 9, 14, 74, 77, 81; Ex. 1003 ¶¶ 189, 192, 193).

We also do not agree with Patent Owner's arguments that “[t]he mere fact that an array or beamformer has the capability to produce certain beams is insufficient, where the array and beamformer are not so configured.” PO Resp. 16. First, if Trigui's antenna arrays produce “n” beams, then it stands to reason that it must be configured to do so; that it may also be configured to produce a different number of beams does not inform whether it teaches the limitations recited in the claim. Even if Trigui meets all of the limitations of claim 1 at some point in time, “combinations of prior art that sometimes meet the claim elements are sufficient to show obviousness.” *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002 (Fed. Cir. 2016); *accord Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003) (“[A] prior art product that sometimes, but not always, embodies a claimed method nonetheless teaches that aspect of the invention.”); *see also Power Integrations, Inc. v. Fairchild Semiconductor Int'l Inc.*, 843 F.3d 1315, 1337 (Fed. Cir. 2016) (finding that claim limitation for a “power

supply regulator” met only during start-up mode, rather than normal operation to be irrelevant to the invalidity analysis). Patent Owner’s hindsight argument will be discussed further below in connection with limitation [1b].

Therefore, we determine Petitioner has shown that Trigui teaches or suggests the subject matter of limitation [1a].

d) Petitioner’s Contentions for Limitation [1b]

Claim 1 also recites:

n multiple-input multiple-output transceivers (MIMO),
each MIMO transceiver comprising:

a MIMO receiver configured to process m different
received signals, wherein an i-th received signal to a j-th MIMO
receiver corresponds to a j-th beam of an i-th antenna array; and

a MIMO transmitter configured to process m different
transmit signals, wherein a v-th transmit signal from a z-th
MIMO transmitter corresponds to a z-th beam of a v-th antenna
array.

Ex. 1001, 10:32–41 (limitation [1b]). Petitioner states that limitation [1b] “requires: (1) the same number (‘n’) of ‘MIMO transceivers’ as there are ‘beams’ for each array in limitation [1a]; and (2) that each MIMO transceiver be connected to one bi-directional beam from each of the ‘m’ arrays in limitation [1a].” Pet. 30.

Petitioner contends that “Trigui . . . teaches the claimed arrangement of MIMO transceivers connected to beams and arrays.” Pet. 31. Petitioner contends that “Trigui’s Figure 10 discloses two MIMO transceivers with two inputs that correspond to a beam from each of the two antenna arrays (i.e., m=2 for both).” Pet. 31 (referencing Ex. 1003 ¶¶ 251–253); *see also id.* at 32 (providing an annotated version of Trigui’s Figure 10).

Petitioner recognizes that Trigui's Figure 10 depicts a single modem, Modem A. *See* Pet. 32 n.4; Ex. 1004, Fig. 10. Petitioner contends that "Trigui teaches (and provides a motivation) to have two 'modems' that are each connected to the two arrays." Pet. 33; *see also id.* at 33–37 (explaining how Trigui's modem is a MIMO transceiver), 37–41 (explaining modifying the embodiment of Trigui's Figure 10 to have two modems, and providing reasons for the modification). Primarily, Petitioner relies on Trigui's teachings that two different wireless operators would share antenna array components, and that each operator would have its own modem. *Id.* at 33 ("Trigui teaches use cases in which two separate wireless network operators would share certain tower components, such as the antenna arrays,[□] but each wireless network operator would have its own baseband unit (i.e., modems A for the first operator and B for the second operator).[□]" (referencing Ex. 1004 ¶¶ 2, 48, 60–70; Ex. 1003 ¶¶ 226–232)).

Petitioner also contends that "Trigui teaches the 'interconnection' limitations that require specific connections between MIMO transceivers and arrays and a relationship between MIMO transceivers and beams." Pet. 41. Petitioner contends that "Trigui teaches that each of the two modems (MIMO transceiver) would be connected to one of the two beams from each of the two arrays," resulting in the interconnection requirements recited in the two "wherein" clauses of limitation [1b]. *Id.* at 41–42. Petitioner concludes that a person having ordinary skill in the art would have found the interconnection recitations of limitation [1b] obvious. *Id.* at 48–50; *see id.* at 48 (providing an annotated version of Trigui's Figure 10 (modified to include two modems) and depicting the cross-connection of received signals).

Petitioner contends that a person having ordinary skill in the art would have been motivated to cross-connect the MIMO transceivers and antenna arrays. Pet. 43; *see id.* at 42–43 (explaining direct and cross connection options); 44–48 (providing seven reasons why a person having ordinary skill in the art would have opted for the cross-connection approach). For example, Petitioner contends that a direct connection approach “does not take full advantage” of sharing antenna arrays. *Id.* at 44 (referencing Ex. 1004 ¶¶ 2, 62–63, 72, 79). As another example, Petitioner contends that cross-connecting minimizes the correlation of signals that reduces the capacity of a MIMO system. *Id.* (referencing Ex. 1006, 473–474; Ex. 1003 ¶¶ 239–240); *see also* Pet. 44–48 (providing other reasons).

e) Patent Owner’s Arguments for Limitation [1b]

Patent Owner argues that Trigui’s “MIMO transceiver branch” is “different from the claimed MIMO transceiver” because it “includes essentially only the analog RF functionality” and “does not include DSP functions such as modulation/demodulation, coding/decoding, etc.” PO Resp. 19; Ex. 2003 ¶ 103. Patent Owner also argues that Trigui’s modem is not the claimed MIMO transceiver because it “is not necessarily MIMO, but rather could be single-input single-output (SISO).” *Id.* (citing Ex. 2003 ¶ 105).

Patent Owner further argues that a person of ordinary skill in the art would not use multiple modems in Trigui’s DIAAs. For example, Patent Owner argues that Trigui’s Figure 10 only discloses at most one MIMO transceiver (e.g., Modem A), and even if a second modem is added it would be for a different operator. PO Resp. 19–21. According to Patent Owner, a person of ordinary skill in the art “would have known that there is no relationship between the modems of two operators” because “[e]very

operator would be transmitting independently, in a different frequency band, and without coordination with the other operator.” *Id.* at 20 (citing Ex. 2003 ¶ 107). Therefore, Patent Owner argues, a person of ordinary skill in the art “would have understood that the number of MIMO branches that one operator uses has no impact on the number of MIMO branches that another operator uses.” *Id.*; *see also id.* at 22–23. Patent Owner also argues that Trigui does not teach any relationship between the number of beams and the number of MIMO transceivers, or that the number of MIMO transceivers matches the number of beams per array. *Id.* at 20–22 (citing Ex. 2003 ¶¶ 110, 111. Patent Owner argues that there is no support that each modem has “a pair” of bi-directional IQ signals; rather, the number of IQ signals does not depend on the number of transmission/reception paths. *Id.* at 21–23 (citing Ex. 2003 ¶¶ 109, 113, 114, 115, 117, 118).

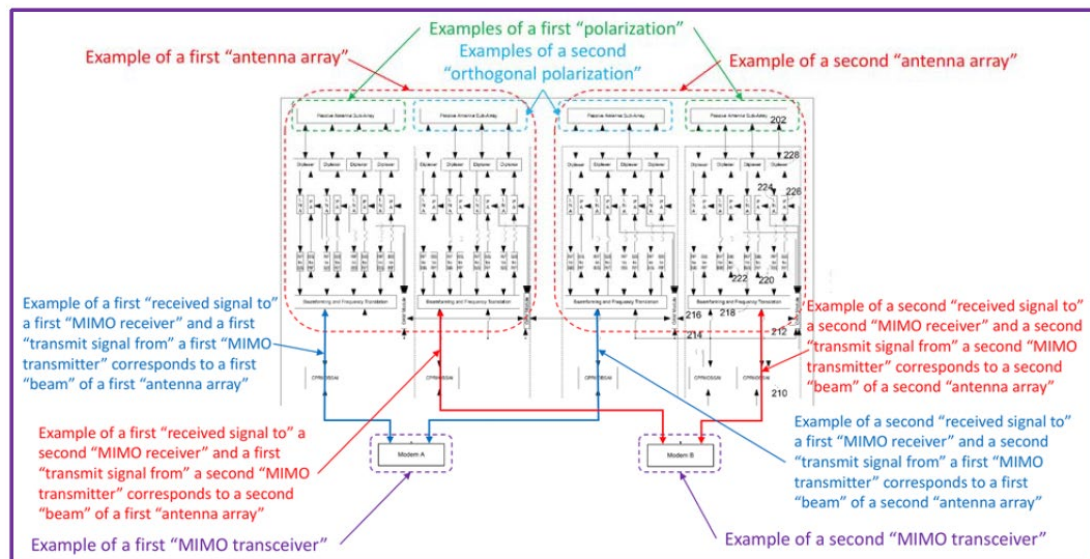
Additionally, Patent Owner argues that because Trigui’s Figure 10 shows that one modem is connected to all four sub-arrays, Petitioner’s arguments for cross-connecting the antenna arrays with the modems are contradicted by and incompatible with Trigui’s teachings, and, therefore, Petitioner improperly relies on hindsight. PO Resp. 24–27 (citing Ex. 2003 ¶¶ 119–125).

f) Analysis of Limitation [1b]

We determine that Petitioner has shown, by a preponderance of the evidence, that Trigui teaches limitation [1b]. We agree with Petitioner that Trigui’s modem teaches the recited “MIMO transceiver.” As Petitioner sets forth, claim 1 requires that each MIMO transceiver comprises “a MIMO receiver configured to process *m* different received signals” and “a MIMO transmitter configured to process *m* different transmit signals.” Pet. 33–34; Ex. 1003 ¶ 215. Petitioner explains that Trigui’s modem performs this

functionality, as well as “the modulation/demodulation and encoding/decoding functions that the ’511 Patent associates with MIMO transceivers.” Pet. 35–36 (citing Ex. 1003 ¶¶ 220–221); *see also* Ex. 1003 ¶ 213; *see also* Pet. 38; Reply 13–14. Moreover, we agree with Petitioner that Patent Owner’s arguments that Trigui’s DIAA may also operate in SISO mode does not negate its MIMO disclosures. Reply 13; Ex. 1004 ¶ 75 (stating that “the DIAA is not limited to deployment as a MIMO device and may be deployed to operate in SISO mode for UMTS”).

Patent Owner argues that Petitioner’s modifications to Trigui’s Figure 10, i.e., adding Modem B and disconnecting Modem A from two of the sub-arrays and connecting Modem B to those sub-arrays is largely hindsight. Sur-reply 2–8. We disagree. Petitioner’s annotated Figure 10, showing the proposed modification to Trigui’s Figure 10 is reproduced below:



Pet. 32, 38. Petitioner’s annotated Figure 10 shows, among other things, the addition of Modem B (i.e., $n=2$), and Petitioner’s identification of the first and second received and transmitted signals from each of the antenna arrays to Modem A and Modem B. As discussed above, we are persuaded that

Petitioner's annotated Figure 10 shows two antenna arrays (i.e., $m=2$) that each produce two different bi-directional beams (i.e., $n=2$).

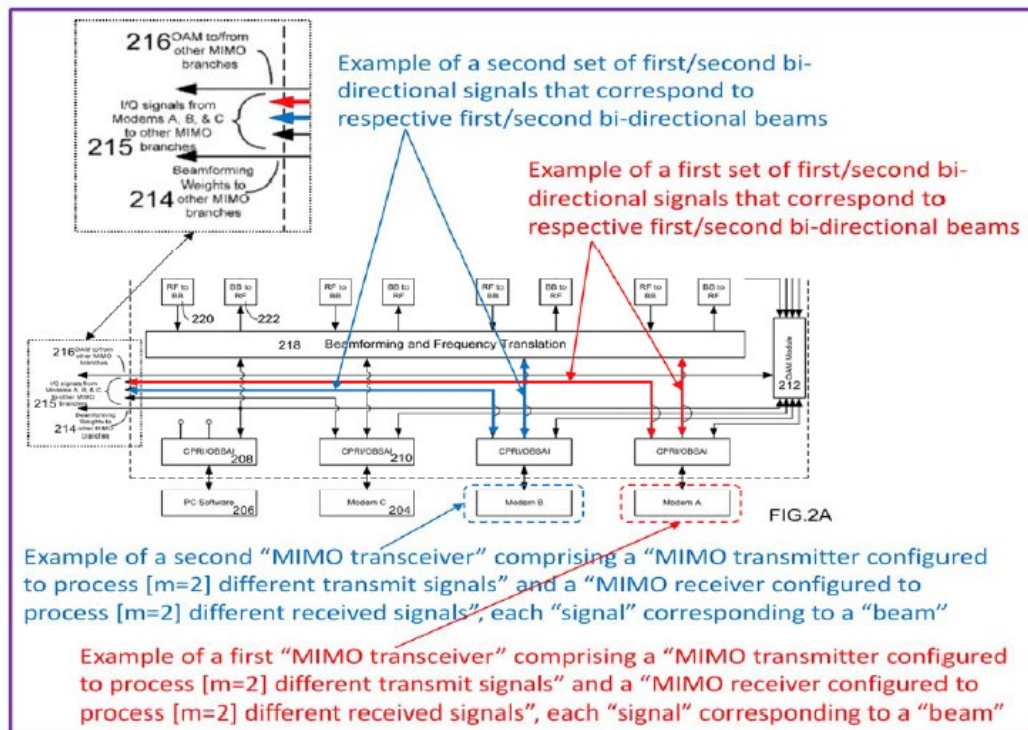
Trigui explicitly discloses that its system may have multiple modems. *See* Pet. 38; Reply 15. For example, Figure 2A shows Modem A, Modem B, and Modem C for a single MIMO branch. Ex. 1004 Fig. 2A; *see also id.* ¶37 (“one or more modems 204, such as, for example, baseband modules of cellular base stations”) ¶41 (“I/Q signals 215 from any of the modems . . . can be sent to other MIMO branches”); *see* Pet. 34. We find persuasive Petitioner's explanation, supported by testimony from Dr. Negus, that “Trigui teaches use cases in which two separate wireless network operators would share certain tower [equipment,] such as the antenna arrays, but each wireless network operator would have its own baseband unit (*i.e.*, modems A for the first operator and B for the second operator).” Pet. 33 (citing Ex. 1003 ¶¶ 226–232); *e.g.*, Ex. 1004 ¶ 48 (stating that “the present invention . . . enable[s] multiple operator sharing of a passive antenna array, transceivers, and the total available power of the DIAA”); *id.* (“[S]plitting resources between the multiple operators is flexible and should be done on the basis of the individual operator needs”); ¶ 2 (“enabling a versatile solution for sharing antenna elements and active electronics between multiple operators servicing the same geographic area”); *see also* Pet. 38–41 (providing further explanation that one modem would be implemented for each operator); Reply 18–21. Patent Owner agrees that the second modem would be for a different operator. PO Resp. 20 (stating that “[E]ven if a second modem is added, it would be for a different operator”).⁵ Therefore, we are persuaded

⁵ In the Sur-reply, Patent Owner argues the opposite; that the operators would not have separate modems. Sur-reply 4. We rely on Patent Owner's

that Trigui teaches, or at least suggests, that two operators may have separate modems that share the two DIAA arrays in Figure 10. Pet. 42; Reply 18; *In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012) (“A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.”). Thus, we find that Petitioner’s proposed modification for Figure 10 is derived from Trigui’s disclosures, not through hindsight. *See In re McLaughlin*, 443 F.3d 1392, 1395 (CCPA 1971) (“Any judgment on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant’s disclosure, such a reconstruction is proper”).

Petitioner’s annotated Figure 2A, reproduced below, persuasively shows how each modem in Figure 2A is connected to one beam in the array:

statements in the Patent Owner Response, as well as Dr. Cooklev’s testimony, which states the same. *See* Ex. 2003 ¶ 107.



Pet. 35. Petitioner’s annotated Figure 2A highlights in red a first set of first/second bi-directional signals, and in blue a second set of first/second bi-directional signals. Figure 2A also shows arrows out labeled “I/O signals from Modems A, B, & C to other MIMO branches,” which Petitioner also highlights in corresponding red and blue. *See also* Ex. 1004 ¶ 41 (stating that “I/Q signals 215 from any of the modems, as well as the beamforming weights 214, can be sent to other MIMO branches”).

Trigui’s DIAA system may have multiple MIMO branches. *E.g.*, Ex. 1004 ¶¶ 36, 41, Fig. 2A. Patent Owner argues that there is no support that each modem has “a pair” of bi-directional IQ signals, but admits that it is “mere possibility,” which is sufficient to establish obviousness. *See* Reply 21; *see Merck & Co. v. Biocraft Laboratories, Inc.*, 874 F.2d 804 (Fed. Cir. 1989) (stating that “‘absolute predictability of success’ is not the criterion . . . all that is required is a reasonable expectation of success”). Regardless, as Petitioner points out, Figure 2A expressly states that each modem has a

separate IQ signal for each of the MIMO branches, which indicates that the number of IQ signals from each modem corresponds to the number of MIMO branches. Reply 21–22; Ex. 1004, Fig. 2A (stating “I/Q signals from Modems A, B, & C to other MIMO branches”); *see also id.* at ¶ 41.

We are also persuaded that Petitioner has shown that Trigui’s system with two modems would be connected to one of the two beams from each of the two arrays shown in Petitioner’s annotated Figure 10. As Petitioner explains, each sub-array of the two arrays in Figure 10 generates a different beam, and each beam transmits a MIMO branch. Pet. 42; Reply 16. That is, each array in Figure 10 has two beams (i.e., $n=2$). Reply 18–19; Pet. 27–29; Ex. 1003 ¶¶ 196–197. Patent Owner provides several arguments, i.e., that the four MIMO branches are bidirectional and that each MIMO branch has its own OBSAI/CPRI interface, but none of these arguments directly address Petitioner’s arguments or sufficiently explain why Trigui does not teach limitation [1b]. PO Resp. 21–23; *see* Reply 18–21. Petitioner has provided thorough reasoning, supported by testimony from Dr. Negus, for the addition of Modem B to Figure 10, which Patent Owner does not persuasively address. *See* Pet. 38–41; Ex. 1003 ¶¶ 226–232.

We are not persuaded by Patent Owner’s arguments that Petitioner’s proposed system “would not be producing n beams, because Trigui does not teach any relationship between the number of beams and the number of MIMO transceivers.” PO Resp. 21. As discussed above, Petitioner has shown Trigui’s system with two antennas (i.e., $m=2$) and two modems (i.e., $m=2$) producing two beams (i.e., $n=2$). That Trigui may also teach other configurations does not detract from this showing.

We are also persuaded by Petitioner’s arguments that it would be an obvious design choice to connect the two antenna arrays with the modems

via the “cross-connect” approach, as shown in Petitioner’s annotated Figure 10. Pet. 42–50. Petitioner provides extensive reasoning, supported by testimony from Dr. Negus and other cited evidence, why a person of ordinary skill in the art would choose a “cross-connect” approach and understand that each of the modems would be connected to one of the two beams from each array. *See id.*; Ex. 1003 ¶¶ 237–253.

Patent Owner’s arguments in response either do not directly address Petitioner’s arguments or do not sufficiently explain why Petitioner’s position is incorrect. For example, Patent Owner argues that Figure 10 contradicts the two ways Petitioner proposes that the antenna arrays could be connected to the modems (i.e., direct connect and cross-connect) because in Figure 10 there is only one modem that is connected to all four sub-arrays. PO Resp. 25; Sur-reply 3–6. But this does not address Petitioner’s obviousness position, which, as discussed above, adds a second modem to Figure 10 based upon the teachings in Trigui. *See Reply 23.*

Patent Owner also argues that the two ways are “inflexible and incompatible” with the teachings of Trigui because flexibility is achieved by connecting the modem to all four sub-arrays of the DIAA, and because there is a separate, dedicated interface to each MIMO branch. PO Resp. 25; *see also* Sur-reply 6–8 (arguing that Petitioner’s modification is inflexible and is an inferior alternative). However, we do not find these arguments persuasive given Trigui’s teachings, which describe, among other things, “a versatile solution for sharing antenna elements and active electronics between multiple operators” and that “splitting resources between the multiple operators is flexible.” Ex. 1004 ¶¶ 2, 48; *see Reply 24.* Moreover, although Patent Owner argues that the type of sharing proposed by Petitioner is “not attractive and even not viable given the OBSAI /CPRI interface to

every branch,” Patent Owner does not provide sufficient explanation as to why this is the case, and does not explain why Petitioner’s cross-connect approach is not viable or desirable. *See* Reply 24. Dr. Cooklev’s cited testimony (Ex. 2003 ¶ 124) merely repeats what is in the Patent Owner Response, with no additional explanation. *See Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022) (precedential) (“Dr. Jones does not cite to any additional supporting evidence or provide any technical reasoning to support his statement. Thus, the cited declaration testimony is conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight.”). However, even if Patent Owner is correct, an obviousness showing 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 motivation for the current invention.” *Novartis Pharms. Corp. v. West-Ward Pharms. Int’l Ltd.*, 923 F.3d 1051, 1059 (Fed. Cir. 2019); *see also In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (“[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes”).

Patent Owner also argues that a person of ordinary skill in the art would have understood that there is minimal correlation between any two antenna sub-arrays according to Trigui’s teachings, so Petitioner’s argument that the cross-connect approach minimizes correlation of signals is wrong. PO Resp. 26. However, Patent Owner does not cite to any teachings from Trigui that support these arguments, and nor does Dr. Cooklev provide any basis for these arguments. *See* Reply 25–26. Even assuming Patent Owner is correct, however, Petitioner provides *seven* reasons why a person of ordinary skill in the art would choose a cross-connect approach, which we

find persuasive, and Patent Owner does not provide any explanation as to why Petitioner's reasoning is incorrect. *See* Pet. 43–48.

Therefore, we determine Petitioner has shown that Trigui teaches or suggests the subject matter of limitation [1b].

g) Limitation [1c]

Finally, claim 1 recites “wherein m , n , v , and z are integer number values, wherein $i=1, \dots, m$, $j=1, \dots, n$, and $v=1, \dots, m$, wherein $n \geq 2$ and $m \geq 2$, wherein $z=1, \dots, w$, and wherein $n \geq w \geq 2$.” Ex. 1001, 10:42–46. Petitioner contends that, based on its contentions with respect to limitations [1a] and [1b], “Trigui's implementation of two independent $2 \times N$ MIMO DIAAs with two independent modems in a two operator system discloses ‘ $m=2$,’ ‘ $n=2$,’ ‘ $i=1,2$,’ ‘ $j=1,2$,’ ‘ $v=1,2$,’ ‘ $z=1,2$,’ and ‘ $w=2$.’” Pet. 50–51 (referencing Ex. 1003 ¶ 270).

Upon review of the information in the Petition and corresponding evidence, including Petitioner's contentions with respect to limitations [1a] and [1b] and reasoning in support of its proposed modifications, we determine Petitioner has shown that Trigui teaches or suggests the subject matter of limitation [1c].

h) Conclusion, claim 1

For the reasons discussed above, we determine that Petitioner has established by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) over Trigui.

2. Independent claims 10, 19, and 20

Independent claims 10, 19, and 20 recite similar subject matter as claim 1. *Compare* Ex. 1001, 10:23–46 (claim 1), *with id.* at 11:1–25 (claim 10), 12:9–22 (claim 19), 12:23–37 (claim 20). Petitioner relies, for the most part, on its contentions with respect to claim 1 for these

independent claims, and provides additional argument and evidence where necessary. Pet. 56, 57–60, *cf.* PO Resp. 13–14 (“The same or limitations, or analogues thereof, appear in the other independent claims 10, 19, and 20” and “Ground 2 relies on Ground 1 for the limitations of the independent claims”). Similarly, Patent Owner relies on its arguments with respect to claim 1 for the other independent claims. PO Resp. 13.

For the reasons discussed above in connection with our analysis of independent claim 1, we determine, that Petitioner has established by a preponderance of the evidence that claims 10, 19, and 20 are unpatentable under 35 U.S.C. § 103(a) over Trigui.

3. Dependent claims 2, 4–6, 9, 11, 13–15, and 18

Dependent claims 2, 4–6, 9, 11, 13–15, and 18 depend directly from either independent claim 1 or independent claim 10. Petitioner contends that Trigui renders obvious these dependent claims. Pet. 51–60. In support, Petitioner identifies certain passages and figures in the references and explains their significance with respect to the corresponding claim limitation. *Id.* We have reviewed Petitioner’s contentions with respect to dependent claims 2, 4–6, 9, 11, 13–15, and 18. Patent Owner does not provide separate arguments directed to these claims. *See generally* PO Resp. Based on our review of the record, we determine that Petitioner has established by a preponderance of the evidence that dependent claims 2, 4–6, 9, 11, 13–15, and 18 are unpatentable under 35 U.S.C. § 103(a) over Trigui, for the reasons set forth in the Petition.

E. Ground 2: Claims 4–6, 13–15, and 18 as unpatentable over Trigui and Rudrapatna

Petitioner contends that dependent claims 4–6, 13–15, and 18 are also unpatentable over the combination of Trigui and Rudrapatna. Petitioner

provides contentions directed to the motivation to combine the teachings of Trigui and Rudrapatna (Pet. 64–65), and a claim-by-claim analysis of combined teachings of the references against the subject matter of dependent claims 4–6, 13–15, and 18 (*id.* at 65–68). Patent Owner does not provide separate arguments directed to this combination and these claims, other than its arguments directed to Trigui and claim 1. *See generally* PO Resp.

We have reviewed Petitioner’s contentions with respect to Ground 2. Based on our review of the record, we determine that Petitioner has established by a preponderance of the evidence that dependent claims 4–6, 13–15, and 18 are unpatentable under 35 U.S.C. § 103(a) over Trigui and Rudrapatna, for the reasons set forth in the Petition.

III. CONCLUSION

For the foregoing reasons, we are persuaded that Petitioner has established by a preponderance of the evidence that claims 1, 2, 4–6, 9–11, 13–15, and 18–20 of the ’511 patent are unpatentable.⁶

In summary:

⁶ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

Claims	35 U.S.C. §	Reference/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 4–6, 9–11, 13–15, 18– 20	103(a)	Trigui	1, 2, 4–6, 9–11, 13–15, 18–20	
4–6, 13–15, 18	103(a)	Trigui, Rudrapatna	4–6, 13–15, 18	
Overall Outcome:			1, 2, 4–6, 9–11, 13–15, 18–20	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 2, 4–6, 9–11, 13–15, and 18–20 of the '511 patent have been shown to be unpatentable; and

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

IPR2024-00868
Patent 8,737,511 B2

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