

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,
Petitioner,

v.

HERA WIRELESS S.A.,
Patent Owner.

IPR2018-01371
Patent 7,962,103 B2

Before THOMAS L. GIANNETTI, ROBERT L. KINDER, and
JOHN A. HUDALLA, *Administrative Patent Judges*.

GIANNETTI, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Granting Patent Owner's Motion to Amend to Cancel Claims 1–6
Denying Patent Owner's Motion to Amend to Substitute Claims 7 and 8
35 U.S.C. § 318(a)

I. INTRODUCTION

Intel Corporation (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–6 of U.S. Patent No. 7,962,103 B2 (Ex. 1001, “the ’103 patent”). Paper 2 (“Pet.”). Patent Owner, Hera Wireless S.A., filed a Preliminary Response. Paper 17.¹ After considering the arguments presented in Patent Owner’s Preliminary Response, we determined that the information presented in the Petition established that there was a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim. Pursuant to 35 U.S.C. § 314, we instituted this *inter partes* review as to all of the challenged claims and all grounds raised in the Petition. Paper 21 (“Institution Dec.”).

Following institution, Patent Owner did not file a Patent Owner Response. Instead, Patent Owner filed a Motion to Amend. Paper 29 (“Motion”). The Motion to Amend requests the Board “to cancel original claims 1–6 of [the ’103 patent] and substitute therefor new claims 7 and 8.” *Id.* at 1; *see also id.* at 2 (“[Patent Owner] respectfully requests that the Board grant this motion to amend and cancel claims 1–6 and substitute claims 7 and 8.”). Subsequently, Petitioner filed an Opposition to the Motion to Amend (Paper 31, “Opp.”), Patent Owner filed a Reply (Paper 34, “Reply”), and Petitioner filed a Sur-reply (Paper 38, “Sur-reply”).

A consolidated oral hearing with related cases IPR2018-01372 and IPR2018-01373, also filed by Intel Corporation, along with cases IPR2018-

¹ To correct a filing error, Patent Owner refiled two versions of the Preliminary Response: one un-redacted (Paper 17) and a second, redacted (Paper 16).

01418, IPR2018-01419, IPR2018-01420, and IPR2018-01421, filed by Ruckus Wireless, et al., was held on November 6, 2019, and a transcript of the hearing is included in the record. Paper 43 (“Hearing Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a). For the reasons we identify below, we *grant* Patent Owner’s Motion to Amend with respect to its request to cancel challenged claims 1–6 of the ’103 patent. We, however, *deny* Patent Owner’s Motion to Amend with respect to its request to substitute proposed claims 7 and 8 for cancelled independent claims 1 and 4, respectively.

A. Related Matters

The parties indicate that the ’103 patent is the subject of numerous district court cases including: (1) *Hera Wireless S.A. v. Amazon.com, Inc.*, 1:17-cv-00947 (D. Del.); (2) *Hera Wireless S.A. v. ARRIS Group, Inc.*, 1:17-cv-00948 (D. Del.); (3) *Hera Wireless S.A. v. Belkin Int’l, Inc.*, 1:17-cv-00949 (D. Del.); (5) *Hera Wireless S.A. v. Netgear, Inc.*, 1:17-cv-00951 (D. Del.); (6) *Hera Wireless S.A. v. Roku, Inc.*, 1:17-cv-00952 (D. Del.); (7) *Hera Wireless S.A. v. Lenovo Holding Co., Inc.*, 1:17-cv-01088 (D. Del.), Pet. 2–3; Paper 14.

The ’103 patent is also the subject of IPR2018-01418, filed by Ruckus Wireless, Inc., Belkin International, Inc., Amazon.com, Inc., Netgear, Inc., and Roku, Inc. Paper 20, 3–4. Concurrently with this Decision, the Board is entering a Final Written Decision in that proceeding. In addition, Petitioner has filed petitions seeking *inter partes* review of patents related to the ’103 patent, including: IPR2018-01372 (challenging U.S. Patent No. 8,412,115) and IPR2018-01373 (challenging U.S. Patent No. 8,934,851). *Id.*

B. The '103 Patent

The '103 patent is titled “Radio Apparatus, and Method and Program for Controlling Spatial Path.” Ex. 1001, (54). The '103 patent generally relates to a radio apparatus capable of establishing multiplex communication between a radio terminal and a radio base station via a plurality of paths formed by space division, as well as to a method and a program for controlling a spatial path. *Id.* at 1:18–24. The '103 patent describes a modification to a Japanese wireless communication system PHS (“Personal Handy Phone System”). *Id.* at 1:65–2:25.

According to the '103 patent, one alleged problem with prior art multi-path communications systems was that, once established, the paths could not be modified, even if a failure occurred in one of the designated paths. *Id.* at 4:13–16. The '103 patent, therefore, proposes a solution providing

a radio apparatus capable of adaptive modification in connection of a plurality of paths between a terminal and a base station in accordance with a communication condition in a mobile communication system where communication is established with a multiple-paths-for-one-user scheme such as the MIMO scheme, as well as a method and a program for controlling a spatial path.
Id. at 4:23–30.

The '103 patent describes use in PHS of PDMA (“Path Division Multiple Access”) to improve efficiency. *Id.* at 2:19–25. In PDMA, mobile radio terminal units of a plurality of users establish spatial multiple connections to a radio base station through a plurality of paths formed by spatially dividing an identical time slot of an identical frequency. *Id.* This allows multiple users to communicate with the base station on the same

carrier frequency and time slot. *Id.* at 3:53–59.

The '103 patent proposes a MIMO (“Multi Input-Multi Output”) scheme in which multiplex communication is established between one terminal having a plurality of antennas and a PDMA base station via a plurality of spatial paths of an identical frequency and an identical time slot. Ex. 1001, 3:24–28. This is illustrated by Figure 2 of the '103 patent, reproduced below.

FIG.2

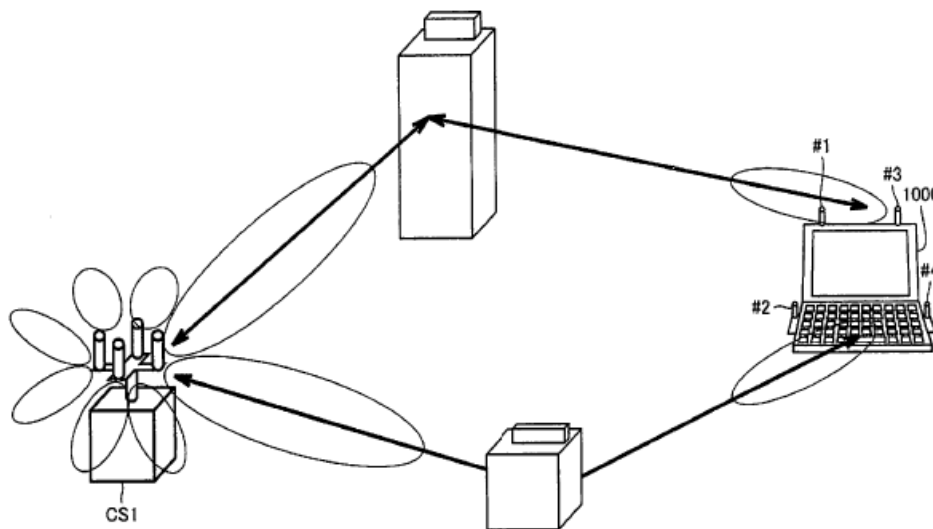


Figure 2 illustrates communication between PDMA terminal 1000 and an array antenna of base station CS1 using multiple spatial paths, where terminal antennas 1 and 3 are used for a first path and terminal antennas 2 and 4 are used for a second path. Ex. 1001, 7:27–30, 9:27–34.

In the embodiment of Figures 2 and 3 (identified as “First Embodiment”), a memory within terminal 1000 stores “antenna number information.” *Id.* at 9:46–47. Terminal 1000 transmits the antenna number information to base station CS1 at a prescribed timing. Base station CS1 issues an instruction for the number of paths to be set to base station 1000

“based on the antenna number information from terminal 1000.” *Id.* at 9:47–51. “Terminal 1000 sets the number of paths to be formed in accordance with the instruction from base station CS1.” *Id.* at 9:51–53.

The ’103 patent further explains, with relation to Figure 3, that antenna number information is transmitted to the base station from terminal 1000 as control information in requesting establishment of a link channel (LCH allocation request). *Id.* at 9:62–65. Base station CS1 gives an instruction for the number of paths “stating that the number of paths to be set should be equal to or smaller than the number of antennas, as the control information for link channel allocation instruction, for example, based on the antenna number information from the terminal.” *Id.* at 9:66–10:4.

II. MOTION TO AMEND

A. Background

We instituted *inter partes* review of claims 1–6 of the ’103 patent on four separate grounds: (1) anticipation by or obviousness over Wallace;² (2) obviousness over Wallace and Ling;³ (3) anticipation by or obviousness over Paulraj;⁴ and (4) obviousness over Paulraj and Mukerjee.⁵ Institution Dec. 6, 36.

As discussed *infra*, Patent Owner now requests cancellation of original claims 1–6 and substitution of new claims 7 and 8 for the cancelled claims. Motion 1. The Motion to Amend is not contingent on our

² U.S. Patent Application Pub. No. 2002/0193146 A1. Ex. 1003.

³ U.S. Patent Application Pub. No. 2003/0003880 A1. Ex. 1004.

⁴ U.S. Patent No. 6,351,499 B1. Ex. 1005.

⁵ U.S. Patent No. 5,479,484. Ex. 1028.

determination as to whether a preponderance of the evidence establishes that challenged claims 1–6 of the '103 patent are unpatentable. We, therefore, *grant* Patent Owner's request to cancel those claims. *Id.* Thus, the only remaining issue before us is whether to grant the Motion to Amend as to proposed substitute claims 7 and 8.

In addition to its Motion to Amend and Reply, Patent Owner relies on two declarations from an expert, Dr. Jacob Sharony, to support the proposed amendment. A first declaration by Dr. Sharony was filed with the Motion to Amend. Ex. 2016 ("Sharony I Decl."). The second was filed with Patent Owner's Reply. Ex. 2024 (Sharony II Decl.). With its Opposition to the Motion to Amend, Petitioner submitted a supplemental declaration by an expert, Dr. Stephen B. Wicker. Ex. 1035 ("Wicker Supp. Decl."). An earlier declaration by Dr. Wicker was submitted with the Petition. Ex. 1002 ("Wicker Decl.").

B. Proposed Substitute Claims

As noted, Patent Owner moves to substitute independent claims 7 and 8 for the cancelled claims, specifically, replacing independent claim 1 with proposed substitute claim 7, and independent claim 4 with proposed substitute claim 8. Motion 1, Claims App'x.

Claims 7 recites the following (with underlining indicating language added to and brackets indicating language removed from independent claim 1):

7. A radio apparatus capable of communicating with another radio apparatus by forming a plurality of spatial paths therebetween, the radio apparatus comprising:

an adaptive array unit capable of performing adaptive array processing on signals corresponding to a plurality of antennas, respectively;

a storage unit which stores prior to any request to establish a link channel with the another radio apparatus [beforehand] a value indicating [possible multiplicity associated with] the maximum number of spatial paths formable by said adaptive array unit for multiplex communication; and

a control unit which controls a process[ing] of transmitting the value [indicating possible multiplicity] to the another radio apparatus [at a predetermined timing] in a request to establish a link channel.

Motion, Claims App'x

Claim 8 recites the following (with underlining indicating language added to and brackets indicating language removed from independent claim 4):

8. A radio apparatus capable of communicating with another radio apparatus by forming a plurality of spatial paths therebetween, the radio apparatus comprising:

a plurality of antennas constituting an array antenna;

an adaptive array unit capable of performing adaptive array processing on signals corresponding to the plurality of antennas, respectively;

a storage unit which stores prior to any request to establish a link channel being sent to the another radio apparatus [beforehand] a value indicating [possible multiplicity associated with] the maximum number of spatial paths formable by said adaptive array unit for multiplex communication; and

a control unit which controls a process[ing] of transmitting the value [indicating possible multiplicity] to the another radio

apparatus [at a predetermined timing] in a request to establish a link channel.

Id.

C. Statutory and Regulatory Requirements

In this proceeding, we first determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121, before considering the patentability of the proposed substitute claim, as set forth further below. *See Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 and IPR2018-01130, Paper 14 (PTAB Feb. 25, 2019) (precedential) (“*Lectrosonics*”).

1. A Reasonable Number of Substitute Claims

A motion to amend may, “[f]or each challenged claim, propose a reasonable number of substitute claims.” 35 U.S.C. § 316(d)(1)(B). “The presumption is that only one substitute claim would be needed to replace each challenged claim, and it may be rebutted by a demonstration of need.” 37 C.F.R. § 42.121(a)(3). Patent Owner cancels six claims and proposes two replacements. We determine that the number of proposed substitute claims is reasonable under 35 U.S.C. § 316(d)(1)(B) and 37 C.F.R. §§ 42.121(a)(3).

2. Responding to a Ground of Unpatentability

“A motion to amend may be denied where . . . [t]he amendment does not respond to a ground of unpatentability involved in the trial.” 37 C.F.R. § 42.121(a)(2)(i). In its proposed substitute claims, Patent Owner adds limitations to cancelled independent claims 1 and 4 and explains how the proposed substitute claims are patentable over the principal references Wallace, Paulraj, and the other references (Ling and Mukerjee) that served as the basis of the grounds of unpatentability involved in the trial. Motion

11–15. Specifically, Patent Owner explains that it has added three categories of allegedly narrowing limitations not present in original claims 1–6:

(1) the term “beforehand” is replaced by the more-specific clause “prior to any request to establish a link channel [with/being sent to] the another radio apparatus”; (2) the clause “value indicating possible multiplicity associated with the number of spatial paths formable by said communication unit” is replaced by the more specific clause “value indicating the maximum number of spatial paths formable by said adaptive array unit for multiplex communication”; and (3) the clause “at a predetermined timing” is replaced by the more specific clause “in a request to establish a link channel.”

Motion 11–12 (alterations in original). Patent Owner contends “[n]one of Petitioner’s references teaches or suggests systems having this new combination of limitations.” *Id.* at 12. We determine that the amended language in the proposed substitute claims, which will be discussed in more detail *infra*, is responsive to the ground of unpatentability involved in this trial under 37 C.F.R. § 42.121(a)(2)(i).

3. *Scope of the Proposed Substitute Claims*

A motion to amend “may not enlarge the scope of the claims of the patent.” 35 U.S.C. § 316(d)(3); *see* 37 C.F.R. § 42.121(a)(2)(ii). Patent Owner contends that the substitute claims are “narrower than the original, now-cancelled claims and introduce no new matter.” Motion 3. We have reviewed the limitations added in the proposed substitute claims (*see supra*) and determine that they do not enlarge the scope of the original cancelled claims.

4. New Matter/Written Description

A motion to amend “may not . . . introduce new matter.” 35 U.S.C. § 316(d)(3); *see* 37 C.F.R. § 42.121(a)(2)(ii). “New matter is any addition to the claims without support in the original disclosure.” *Lectrosonics*, Paper 15 at 7 (citing *TurboCare Div. of Demag Delaval Turbomachinery Corp. v. General Elec. Co.*, 264 F.3d 1111, 1118 (Fed. Cir. 2001)).

In order to show that an amendment does not introduce new subject matter, a motion to amend must set forth “[t]he support in the original disclosure of the patent for each claim that is added or amended” and “[t]he support in an earlier-filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought.” 37 C.F.R. § 42.121(b)(1) and (2).

Patent Owner provides a chart with citations to earlier-filed disclosures for each respective limitation of the proposed substitute claims. Motion 5–10. The chart purports to show that proposed substitute claims 7 and 8 are supported by U.S. Patent Application 12/463,657, filed September 22, 2004 (Ex. 2017, “the ’657 application”), which issued as the ’103 patent.⁶ Patent Owner also provides citations showing that the proposed substitute claims are supported by earlier-filed disclosures for which benefit of the filing date is sought—namely, U.S. Patent Application No. 10/508,655 (Ex. 2018, “the ’655 application”), filed on March 11, 2003,⁷ and an English translation (Ex. 2020) of Japanese Patent Application

⁶ The heading of Patent Owner’s chart (Motion 5) incorrectly identifies the ’657 application as Exhibit 2016.

⁷ The same heading incorrectly identifies the ’655 application as Exhibit 2017.

No. JP-2002-081375 (Ex. 2019, “the ’375 application”), filed on March 22, 2002. Motion 5–10.

For reasons that will be discussed *infra*, of particular relevance to this discussion is whether the original disclosure of the ’657 application, and the earlier-filed disclosures of the ’655 and the ’375 applications, provide sufficient written description support for the added claim limitation of storing “a value indicating the maximum number of spatial paths formable” in “a request to establish a link channel,” as recited in proposed substitute claims 7 and 8. *See* discussion of those claims *supra*. Specifically, in responding to Petitioner’s prior art challenge to claims 7 and 8, Patent Owner argues that the claim limitation “value indicating the maximum number of spatial paths formable” is not met by sending the number of antennas. *See, e.g.*, Hearing Tr. 108:4–8 (“If the mobile station is saying I am going to count up the number of antennas . . . it is not sending the number of spatial paths. It is sending the number of antennas.”).

As support for this limitation added in the proposed substitute claims, Patent Owner’s chart refers to Figure 7 of the ’657 application and the accompanying description in the text. Motion 6, 9. That figure (designated “Second Embodiment”) in the ’657 application is a flowchart that shows “flow in [the] adaptive control of the number of paths set” in two different variations. Ex. 2017, 20:6–10.⁸ In a first variation, the terminal notifies the base station of “the number of antenna elements N in the terminal.” *Id.* at 20:15–17. Thus, referring to this disclosure for written description support

⁸ Citations to Exhibits 2017 and 2018 refer to page and line numbers. Page numbers are those appearing in the original documents.

of proposed substitute claim 7 and 8, Patent Owner states: “Terminal 2000 notifies base station CS1 of the number of antenna elements N in the terminal.” Motion 6, 9 (citing Ex. 2017, 20:15–17).

Furthermore, as discussed *supra* in summarizing the ’103 patent, describing the First Embodiment of Figures 2 and 3, the ’657 application explains: “First, the antenna number information is transmitted to the base station from terminal 1000 as control information in requesting establishment of a link channel (LCH allocation request).” Ex. 2017, 16:10–12. Patent Owner quotes this portion of the specification in support of its proposed amendment. Motion 7 (quoting Ex. 2017, 16:10–12), 9 (same). In the very next sentence, the ’657 application relates the number of paths to the number of antennas, explaining further that in this embodiment, “[b]ase station CS1 gives an instruction for the number of paths stating that *the number of paths to be set should be equal to or smaller than the number of antennas*, as the control information for link channel allocation instruction, for example, based on the antenna number information from the terminal.” Ex. 2017, 16:13–16 (emphasis added). Patent Owner cites this and similar discussions from the ’655 application and the ’375 application. *See, e.g.*, Motion 7 (citing Ex. 2018, 16:10–12; Ex. 2020 ¶ 75), 9 (citing Ex. 2018, 16:10–12; Ex. 2020 ¶ 35).

Petitioner’s opposition challenges Patent Owner’s showing of written description support for this proposed amendment. Opp. 24–30. Specifically, Petitioner contends “as Hera interprets them, the proposed claims extend beyond the applications’ disclosure and are therefore unpatentable because they lack written description support.” *Id.* at 24. Petitioner continues, “[t]he original and priority applications, however, only

describe storing and sending antenna number information, not some other value indicating a maximum number of spatial paths formable, in a request to establish a link channel.” *Id.*, at 25.

At the oral hearing, however, Petitioner’s counsel stated that, if we were to agree with Petitioner’s position that the proposed claims are unpatentable over Wallace, “it becomes unnecessary to address the written description point.” Hearing Tr. 70:9–11.

Based on the disclosures in the ’657 application, the ’655 application, and the ’375 application, we find that there is sufficient written description support for this limitation. The ’103 patent and its previously-filed supporting applications describe at least one embodiment where a terminal transmits antenna number information in a link channel request. Specifically, in the First Embodiment discussed *supra* in relation to Figure 3, the antenna number information is transmitted to the base station from terminal 1000 as control information in requesting establishment of a link channel (LCH allocation request). Ex. 1001, 9:62–65. We further find that this amounts to transmitting a “value indicating the maximum number of spatial paths formable” in “a request to establish a link channel,” as recited in the proposed substitute claims. *See* discussion *infra*. So, too, does the description of the first variation of the Figure 7 Second Embodiment, described *supra*. This showing discharges Patent Owner’s burden on this issue.

However, because we also conclude, *infra*, that proposed substitute claims 7 and 8 are anticipated by and would have been obvious in light of Wallace, and in view of counsel’s concession at the oral hearing, we do not find it necessary to further address Petitioner’s specific written description

arguments. *See* Hearing Tr. 70:9–11 (“[I]f you agree with us on Wallace, it becomes unnecessary to address the written description point”).

D. Patentability of Proposed Substitute Claims 7 and 8 over Wallace

1. Introduction

Petitioner challenges proposed substitute claims 7 and 8 as anticipated by or obvious over Wallace or Paulraj (*see supra*) in view of the knowledge of a person of ordinary skill in the art. Opp. 3. Patent Owner “does not bear the burden of persuasion to demonstrate the patentability of [the proposed] substitute claims.” *Lectrosonics*, Paper 15 at 4 (citing *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017); *Bosch Auto. Serv. Sols. LLC v. Iancu*, 878 F.3d 1027 (Fed. Cir. 2017)). “Rather, as a result of the current state of the law and [Office] rules and guidance, the burden of persuasion will ordinarily lie with the petitioner to show that any proposed substitute claims are unpatentable by a preponderance of the evidence.” *Lectrosonics*, Paper 15 at 4.

We begin our analysis with the principles of law and other related matters that generally apply to anticipation and obviousness, followed by a brief overview of Wallace and Petitioner’s arguments based on Wallace.⁹

2. Principles of Law

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628,

⁹ To meet one limitation of the proposed substitute claims, Petitioner alternatively relies on the combination of Wallace and Mayrand (U.S. Patent No. 5,504,939; Ex. 1036). Opp. 13–14. *See* discussion *infra*.

631 (Fed. Cir. 1987). However, there is no *ipsissimis verbis* test for determining whether a reference discloses a claim element, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). When evaluating a single prior art reference in the context of anticipation, the reference must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)).

A claim is unpatentable as obvious under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations).¹⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze Petitioner’s unpatentability arguments with the principles identified above in mind.

3. *Person of Ordinary Skill*

Relying on the testimony of Dr. Sharony, Patent Owner contends that a person of ordinary skill in the art at the time of the invention of the ’103 patent would have possessed “working knowledge of multi-input multi-

¹⁰ Patent Owner did not present arguments or evidence regarding secondary considerations during the course of the trial.

output (MIMO) wireless communications. That person would have gained this knowledge through a Bachelor of Science degree in Electrical Engineering or an equivalent degree, and three to five years of experience working in the field of wireless communications. Additional education or experience may serve as a substitute for these requirements.” Motion 4 (*citing* Sharony I Decl. ¶ 28).

Petitioner’s Opposition does not dispute Dr. Sharony’s assessment of the level of skill in the art. The Petition, however, provides the following description: “As of 2002 or 2003, a skilled person in the ’103 patent’s field would have a Master’s degree in Electrical Engineering and at least 2-4 years of academic or industry experience in designing and implementing digital wireless communication systems.” Pet. 13 (*citing* Wicker Decl. ¶ 54). The parties’ formulations differ mainly in the level of education (Bachelor’s degree for Patent Owner, Master’s degree for Petitioner) and amount of experience in wireless communications (three to five years for Patent Owner, two to four years for Petitioner).

We regard any differences in the two formulations as insignificant. For the purpose of this Final Written Decision, we adopt Patent Owner’s proposal as consistent with the prior art before us. However, we would reach the same result with regard to this decision under either formulation.

4. Claim Construction

In this *inter partes* review proceeding, filed before November 13, 2018, we interpret claim terms according to the broadest reasonable construction in light of the specification of the patent in which they appear.

37 C.F.R. § 42.100(b) (2018).¹¹ Under that standard, and absent any special definitions, claim terms generally are given their ordinary and customary meaning, as would have been understood by one of ordinary skill in the art, at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Referring to the terms in the original claims that are carried over in claims 7 and 8, Patent Owner asserts it “does not rely on those or any other specific claim constructions to demonstrate patentability of the proposed substitute claims over the prior art. Rather, Patent Owner demonstrates patentability based on the new limitations of the proposed substitute claim.” Motion 10. Thus, Patent Owner contends that “[t]he meanings of any new limitations (e.g., ‘maximum number of spatial paths’ or ‘request to establish a link channel’)—taken as a whole—are discernable from their context and would be readily understood by those of ordinary skill in the art.” *Id.*

Petitioner does not contend that any claim term requires an explicit construction to determine whether proposed substitute claims 7 and 8 are unpatentable in light of the prior art of record. In the course of our discussion of the merits of Patent Owner’s motion and Petitioner’s opposition, however, we do address the scope of those claims in applying them to Wallace.

¹¹ 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) (“This rule is effective on November 13, 2018 and applies to all . . . petitions filed *on or after the effective date.*” (emphasis added)).

5. Wallace Overview

Wallace is titled “Method and Apparatus for Antenna Diversity in a Wireless Communication System.” Ex. 1003, (54). Wallace discloses a “[m]ethod and apparatus for negotiating a transmission scenario in a mixed mode spectrum wireless communication system.” *Id.* at (57); *see also id.*

¶ 74 (disclosing a “mixed mode operation for one embodiment” where “the base station negotiates with user terminals to determine antenna diversity status of the terminal”).

Of particular relevance to this case, Wallace discloses the use of wireless MIMO technology, as well as receiving signals and performing adaptive array processing. *Id.* ¶¶ 31 (“Using Multiple Input-Multiple Output, MIMO, the transmitter can send multiple independent data streams on the same carrier frequency to a user.”), 95 (“[T]he receiver performs a complementary processing (e.g., spatial matched filter) of the linear transmit processing based on the channel characterization to compute the NC spatial matched filter coefficients needed for each transmission channel (i.e., each eigenmode).”). This is illustrated in Figure 12 of Wallace, reproduced below.

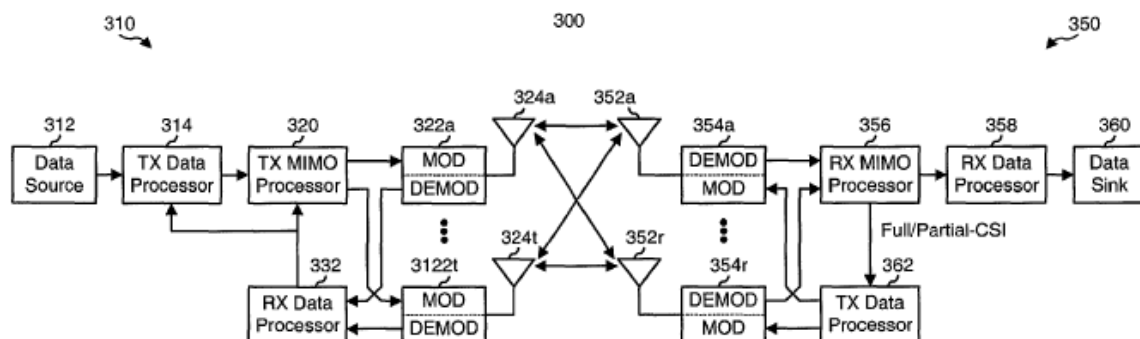


FIG. 12

Figure 12 depicts a “wireless communication system capable of MIMO and diversity transmissions.” Ex. 1003 ¶ 22. Wallace explains that “[s]ystem 300 may be operated to transmit data via a number of transmission channels.” *Id.* ¶ 93.

Wallace relates the number of transmission channels (NC) to the number of transmit (NT) and receive (NR) antennas: “A MIMO channel may be decomposed into NC independent channels, with $NC \leq \min \{NT, NR\}$.” *Id.* Wallace explains further that “[e]ach of the NC independent channels is also referred to as a spatial subchannel of the MIMO channel. For a MIMO system, there may be only one frequency subchannel and each spatial subchannel may be referred to as a ‘transmission channel’.” *Id.*

Wallace explains also that a MIMO system, such as that shown in Figure 12, “can provide improved performance if the additional dimensionalities created by the multiple transmit and receive antennas are utilized.” *Id.* ¶ 94.

The base station of Wallace is illustrated in Figure 18, reproduced below.

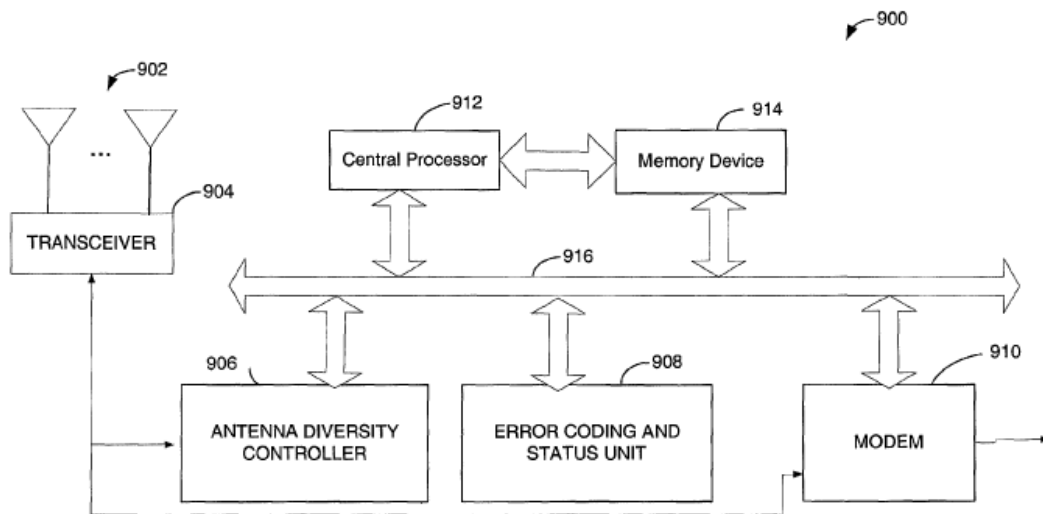


FIG. 18

Figure 18 illustrates base station 900 that includes, among other things, transceiver 904 coupled to multiple antennas 902 (including multiple transmit and receive antennas), central processor 912, and memory device 914. Ex. 1003 ¶ 122.

The mobile station of Wallace is illustrated in Figure 20, reproduced below.

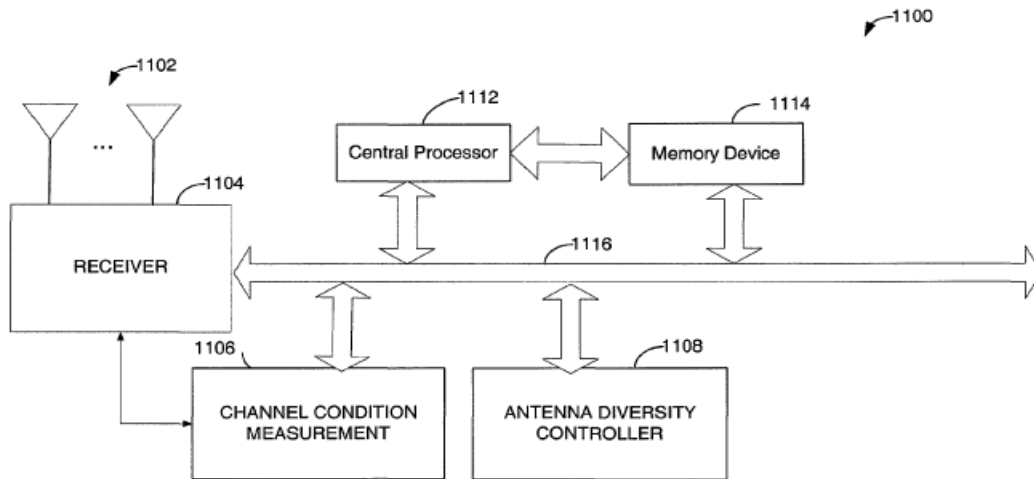


FIG. 20

Figure 20 illustrates mobile station 1100, which includes, among other things, receive antenna array 1102 coupled to receiver 1104 (which may be a transceiver), memory device 1114, and central processor 1112. Ex. 1003 ¶ 139.

Wallace explains that the process of negotiating a forward link between a mobile user and a base station “starts with a query to the mobile user to determine diversity capability information,” including, for example, information regarding the “number of receive antennas used at the mobile station.” Ex. 1003 ¶ 104. The base station may also request additional information concerning, for example, the “channel quality of [a] given link.”

Id. In response to this information, the base station determines the appropriate configuration for the forward link. *Id.*

Wallace further discloses that, “[t]ypically, antenna diversity negotiations are performed at initiation of a communication, however, alternate embodiments may allow adjustment during a communication, wherein the quality of the communication link channel degrades over time and environmental condition.” Ex. 1003 ¶ 127. In addition, Wallace discloses that its approach can be used in time division multiple access (“TDMA”) systems. *Id.* ¶¶ 33–35, 69.

6. Analysis of Proposed Substitute Claim 7

Petitioner presents arguments and evidence that proposed substitute claims 7 is anticipated by and would have been obviousness in light of the teachings of Wallace. Opp. 3–15. Petitioner provides an element-by-element analysis of Wallace in relation to claim 7. *Id.* As discussed in detail below, we credit Petitioner’s analysis and find Petitioner has demonstrated by a preponderance of the evidence that each element of proposed claim 7 is disclosed by Wallace and thus Wallace anticipates claim 7. Further, we determine, separately, that Petitioner has demonstrated that each element of claim 7 is taught or suggested by Wallace, and that the subject matter of claim 7, as a whole, would have been obvious in light of Wallace to a person of ordinary skill. Our reasoning follows.

a. “A radio apparatus capable of communicating with another radio apparatus by forming a plurality of spatial paths therebetween, . . . comprising”

Petitioner contends that even if this preamble of proposed substitute claim 7 is limiting, Wallace discloses the preamble. Opp. 3; Pet. 34–35. We find that Wallace discloses the claim 7 preamble because Wallace describes

a wireless communication system with a base station and terminals.

Ex. 1003, Fig. 12, ¶ 97. The base station communicates with the terminals. *Id.* Fig. 5, ¶ 71. Thus, the terminal of Wallace is “a radio apparatus,” and the base station is “another radio apparatus.” Pet. 34; Wicker Supp. Decl. ¶ 20; Wicker Decl. ¶¶ 244–246. Furthermore, the base station communicates with the mobile station over a plurality of spatial paths using MIMO technology. Wicker Decl. ¶ 245.

Patent Owner does not challenge this assertion by Petitioner.

b. “an adaptive array unit capable of performing adaptive array processing on signals corresponding to a plurality of antennas, respectively”

Petitioner contends that Wallace discloses the “adaptive array unit” of proposed substitute claim 7. Opp. 3; Pet. 35–37. We find that Wallace meets this limitation. Wicker Supp. Decl. ¶ 21; Wicker Decl. ¶¶ 246–250. Wallace teaches that receiver/transceiver 1104 (Fig. 20, *supra*) carries out adaptive array processing. Pet. 15 (citing Ex. 1003 ¶ 95); Wicker Decl. ¶ 248. Further, the receiver/transmitter processes signals from a plurality of antennas 1102. Ex. 1003 Fig. 20, ¶ 139; Wicker Decl. ¶ 249.

Patent Owner does not challenge this assertion by Petitioner.

c. “a storage unit which stores prior to any request to establish a link channel with the another radio apparatus a value indicating the maximum number of spatial paths formable by said adaptive array unit for multiplex communication”

This limitation of proposed substitute claim 7 lies at the core of Petitioner’s opposition to the Motion to Amend and Patent Owner’s response. We now discuss, in turn, two aspects of this limitation.

- i. “a value indicating the maximum number of spatial paths formable by said adaptive array unit for multiplex communication”*

Petitioner contends that Wallace meets this limitation. Opp. 4–5; Wicker Supp. Decl. ¶¶ 23, 26. We agree with Petitioner and find that to a person of ordinary skill, Wallace discloses spatial multiplexing and the use of spatial paths for multiplex communication. Opp. 4; Wicker Supp. Decl. ¶ 23. Petitioner explains that “Wallace taught a MIMO communication channel between two wireless devices having multiple antennas (e.g., a mobile station and a base station) that includes ‘NC independent channels,’ where each is a separate ‘spatial subchannel.’” Opp. 4 (citing Ex. 1003 ¶ 93; Wicker Supp. Decl. ¶¶ 22–25). This allows Wallace to provide an adaptive array unit to send and receive multiple independent streams of data on the same frequency using spatial multiplexing using multiple antennas. Ex. 1003 ¶¶ 66, 95, 100, 106; Wicker Supp. Decl. ¶ 25; Wicker Decl. ¶ 247.

Further, we find that in Wallace the number of receive and transmit antennas provides a value indicating the maximum number of spatial paths formable. *See, e.g.*, Ex. 1003 ¶¶ 66, 93; Wicker Supp. Decl. ¶ 23. Specifically, Wallace discloses that for MIMO channels, the number of transmit antennas (NT) or the number of receive antennas (NR), whichever is lower, provides an upper bound on the number of spatial subchannels (NC) formable. *See* discussion of Wallace, *supra*; Ex. 1003 ¶ 66 (“ $N = \min(N_t, N_r)$ ”), ¶ 93 (“NC” is less than or equal to “{NT, NR}”); Wicker Supp. Decl. ¶¶ 23, 26.

Based on the foregoing, we find a person of ordinary skill would have understood from Wallace that the maximum number of spatial paths formable by a terminal for multiplex communication can equal the number

of antennas available to the terminal for a communication link. Wicker Supp. Decl. ¶¶ 23–26. As discussed *supra*, Wallace explains that the process of negotiating a forward link between a mobile user and a base station “starts with a query to the mobile user to determine diversity capability information,” including, for example, information regarding the “number of receive antennas used at the mobile station.” Ex. 1003 ¶ 104. The base station may also request additional information concerning, for example, the “channel quality of [a] given link.” *Id.* In response to this information, the base station determines the appropriate configuration for the forward link. *Id.*

Patent Owner contends that this information in Wallace on the number of antennas does not meet the claim limitation. Reply 1–6. Patent Owner argues: “Wallace does not contain any teaching of the use of sub-arrays. The presence of sub-arrays will necessarily result in the maximum number of spatial paths formable by a particular unit being different (and less) than the total number of antennas, as the antennas within each sub-array function as a single antenna for purposes of establishing spatial paths.” *Id.* at 2 (citations omitted). According to Patent Owner: “While Wallace does disclose the possibility of transmitting the number of antennas as part of diversity negotiations, the number of spatial paths is a different parameter that *does not have to be, and usually is not*, the same as the number of antennas.” *Id.* (emphasis added). Further, Patent Owner argues: “Since the number of subarrays is dynamically configurable, so is the ‘maximum number of spatial paths.’” *Id.* at 5. At the oral hearing, Patent Owner presented its position another way:

THE BOARD: So would it be fair to characterize patent owner's position as that antenna number information is *necessary, but not sufficient* to define the number of spatial paths formable?

PATENT OWNER'S COUNSEL: Yes, I think that is fair, Your Honor.

Hearing Tr. 112:18–23 (emphasis added).

We do not agree with Patent Owner's argument that the antenna number information in Wallace is not "a value indicating the maximum number of spatial paths formable." As Petitioner points out, the proposed substitute claims "say nothing about a 'dynamically configurable' number of 'configured sub-arrays.'" Sur-reply 2; *see also In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (explaining that limitations not appearing in the claims cannot be relied upon for patentability). Patent Owner could have added such a limitation as part of its amendments, but chose not to do so. Instead, each of the proposed substitute claims calls for "a value indicating the maximum number of spatial paths formable." Motion, Claims App'x.

Although it is true that the antennas in a communication system may be grouped in sub-arrays, there is no dispute that this is not a requirement for communications to take place. Thus, at least in those situations where there are no sub-arrays or each "subarray" has only one antenna, the number of antennas would be indicative of the maximum number of paths and would meet the claim limitation. Sharony II Decl. ¶ 55 ("The two numbers coincide only when each subarray contains exactly one antenna and all antennas work and are used in the subarray."). We do not agree with Patent Owner's argument distinguishing Wallace based on "antenna arrays," as it is not supported by the language of the proposed substitute claims. Nor is it supported by the specification of the '103 patent, where in at least one

embodiment “the number of paths to be set should be equal to or smaller than the number of antennas.” Ex. 1001, 9:66–10:4.

At the oral hearing, Patent Owner shifted the focus of its argument on Wallace to the Second Embodiment of Figure 7 of the '103 patent. *See, e.g.*, Hearing Tr. 109:6–110:2. Thus, to support its argument that the scope of the proposed substitute claims excludes Wallace’s transmitting the number of antennas as part of diversity negotiations, Patent Owner relies on the Figure 7 variation, discussed briefly *supra*, involving P_MAX. Hearing Tr. 109:23–110:2. Figure 7 of the '103 patent is reproduced below.

FIG.7

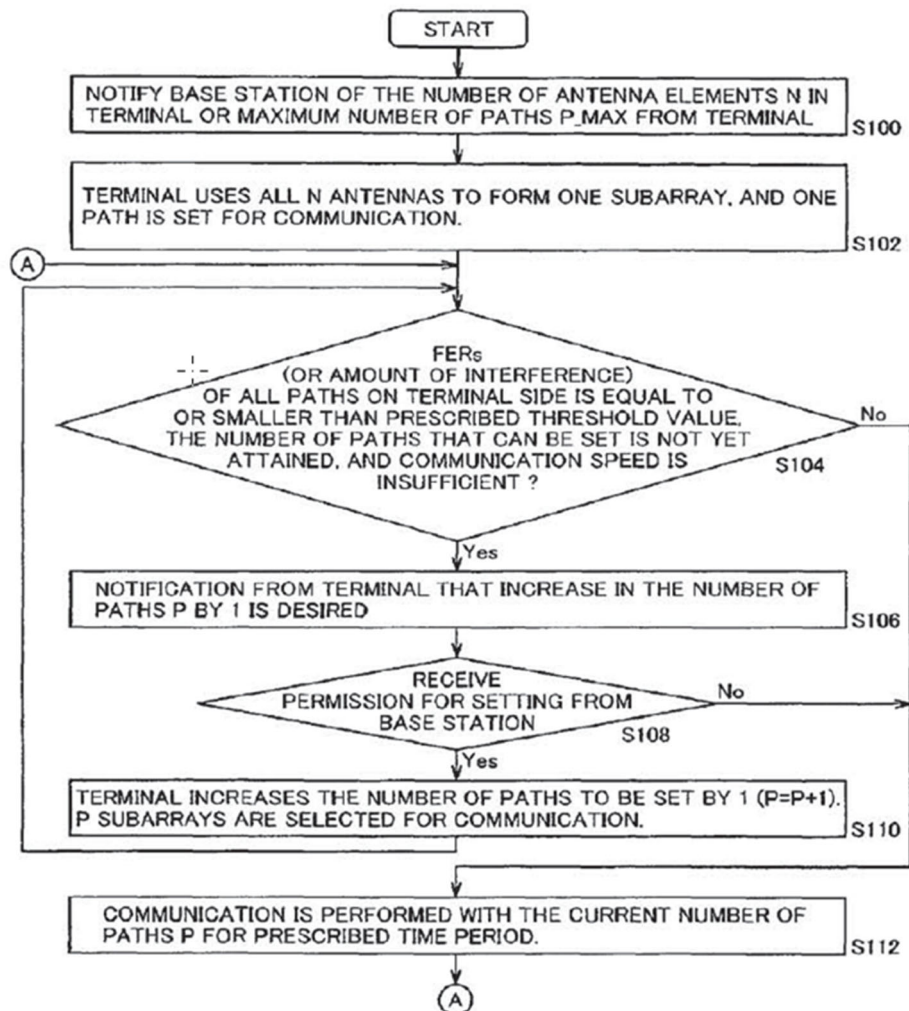


Figure 7 is a flowchart showing the steps in the adaptive control of the number of paths set in a PDMA terminal. As noted previously in our written description analysis, Figure 7 is described in the '103 patent as “Second Embodiment.” Ex. 1001, 12:17–23. As discussed, the initial step (S100) of Figure 7 involves two alternatives: a first terminal either notifies base station CS1 of the “number of antenna elements N in the terminal *or* the maximum number of paths P_MAX.” *Id.* at 12:30–32 (emphasis added). According to Patent Owner, the proposed substitute claims exclude the first alternative:

Figure 7 allows for two alternatives. . . . One alternative is to send the number of antennas. Another alternative, *which is the one that we are now claiming*, is the one where you send the maximum number of paths P_MAX formable.

Hearing Tr. 109:24–110:2 (emphasis added). Thus, Patent Owner argues that the proposed substitute claims should be limited to the variation of Figure 7 where the base station is given “the maximum number of paths P_MAX.” *Id.* at 109:23–110:2; 111:20–23; 115:19–116:2.

For several reasons, we are not persuaded by this argument. We first look at the language of the claim itself. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005). The claim language imposes no requirement that the value be the actual number of paths, only that it be “a value indicating the maximum number of spatial paths *formable* by said communication unit.” Motion, Claims App’x (emphasis added). There is no dispute that it is “well known” in MIMO spatial multiplexing that the number of antennas may set the upper limit for the number of paths, *e.g.*, when there are no antenna arrays. *See, e.g.*, Hearing Tr. 138:3–5 (“[W]e don’t dispute that the maximum number of spatial paths formable in any instance is going to be no more than the number of antennas.”). There is

also no dispute that the number of antennas is “a relevant factor.” *Id.* at 119:9–10.

Nor does the ’103 patent specification support the argument by Patent Owner. Patent Owner’s argument ignores the First Embodiment of the ’103 patent, discussed *supra* in relation to Figures 2 and 3. Ex. 1001, 8:30–11:3. As explained *supra*, in that embodiment, “the antenna number information is transmitted to the base station from terminal 1000 as control information in requesting establishment of a link channel (LCH allocation request).” *Id.* at 9:62–65. Base station CS1 gives an instruction for the number of paths stating that “the number of paths to be set should be equal to or smaller than the number of antennas, as the control information for link channel allocation instruction, for example, based on the antenna number information from the terminal.” *Id.* at 9:66–10:4. And in addition, the Second Embodiment illustrated in Figure 7 discloses the alternative initial step of notifying the base station of the number of antennas. *See* discussion *supra*.

Patent Owner’s attempt to limit its claims by relying on the Figure 7 “P_MAX” variation is unconvincing. Although the claims must be read in view of the specification, “limitations from the specification are not to be read into the claims.” *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1326 (Fed. Cir. 2002) (citations omitted). “[T]he claims of the patent will not be read restrictively, unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction.” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) (*citing Teleflex*, 299 F.3d at 1327). As noted *supra*, the ’103 patent discloses sending antenna number information to the

base station as an upper bound for the number of paths. Ex. 1003 ¶¶ 31, 66, 93; Wicker Supp. Decl. ¶ 26. Moreover, as discussed *supra*, Patent Owner relies on that very disclosure as providing written description support for the proposed substitute claims. See Motion 6, 9.

In light of the foregoing, we credit Petitioner's evidence on this limitation, supported by the testimony of Dr. Wicker, and find that the limitation is met by Wallace. Wicker Supp. Decl. ¶¶ 22–27.

In response to Patent Owner's P_MAX argument, Petitioner asserts that P_MAX is a value that is derived after communication is established. Thus, according to Petitioner, a frame error rate counter (FER) in the '103 patent calculates how many frames reach their destination terminal without an error. Hearing Tr. 72:6–13; Ex. 1001, 11:14–18. Petitioner explains that this stored information, in turn, is used to determine the value P_MAX. Hearing Tr. 72:14–73:3; Ex. 1001, 11:37–42. Thus, Petitioner argues that in order to establish communication, the first step would be to transmit the antenna information, and not P_MAX. Hearing Tr. 74:8–23.

While we see merit in Petitioner's argument, we do not find it necessary to determine whether P_MAX is transmitted initially or derived after communication has started. We find (and Patent Owner does not dispute) that in one variation of this Second Embodiment, communication is initiated by transmitting the number of antennas to the base station. Hearing Tr. 109:17–110:2. For reasons discussed *supra*, we are not persuaded by Patent Owner's attempt to limit its claim to exclude that variation of the Second Embodiment or the description in the '103 patent of the First Embodiment.

ii *“a storage unit which stores prior to any request to establish a link channel with the another radio apparatus . . .*

Petitioner contends that this element of claim 7 is met in Wallace. Opp. 5–8; Wicker Supp. Decl. ¶¶ 22, 27–29. Wallace teaches that the steps of all its methods or algorithm, including providing the base station with the number of antennas and other information, may be embodied in “a software module executed by a processor.” Ex. 1003 ¶ 145. Wallace also teaches a memory device used by a central processor to store and retrieve information. Ex. 1003, Fig. 20, ¶¶ 138–139. For example, the double-headed arrows shown in Figure 20 between Wallace’s memory device 1114 and central processor 1112 of mobile unit 1100 show the exchange of information between those devices. Opp. 6; Wicker Supp. Decl. ¶ 27; Wicker Decl. ¶ 259 (“In order to transmit these values to the base station, the mobile station would have needed to previously store them”).

We find a skilled person would have understood that in Wallace the mobile station’s processor would read the previously-stored number of transmit and receive antennas from a storage medium in order to transmit them in a link channel request. Opp. 6; Wicker Supp. Decl. ¶ 29 (“Sending a value is not possible without first storing it before transmission.”); Wicker Decl. ¶¶ 259–260. We find therefore that Wallace discloses storing the antenna number information prior to any request to establish a link channel from another radio apparatus. Opp. 7–8; Wicker Supp. Decl. ¶ 28.

d. *“a control unit configured to control a process of transmitting the value to said another radio apparatus in a request to establish a link channel”*

Petitioner contends that this limitation is met by Wallace. Opp. 8–9; Wicker Supp. Decl. ¶¶ 32–33. We find that the claimed control unit is

taught by Wallace. Wallace's mobile station 1100 (Fig. 20, *supra*) includes central processor 1112 which "controls operation within the mobile station." Ex. 1003 ¶ 140; Wicker Decl. ¶ 265–267.

We find also that a person of ordinary skill would have recognized that Wallace discloses a process of transmitting antenna number information in a message for initiating a communication link with a mobile station. Ex. 1003 ¶¶ 123, 125; Wicker Supp. Decl. ¶ 32. Wallace's base station "requires antenna diversity status information on initiation of an active communication" with a mobile station. Ex. 1003 ¶ 77 (emphasis added). When a mobile station initiates communication by sending a request, that request includes the required antenna diversity information. *Id.* ¶¶ 123, 125; Wicker Supp. Decl. ¶ 33. We find that a person of ordinary skill would have understood that antenna diversity information to include the number of transmit and receive antennas. Ex. 1003 ¶¶ 123, 125 ("For a given mobile user, the antenna diversity status may include the number of transmit antennas, the number of receive antennas . . .").

Sending antenna number information in such a request allowed the base station in Wallace to select a transmission scenario for the mobile station. Ex. 1003 ¶ 124; Wicker Supp. Decl. ¶ 29. To configure the communications link, the base station needs "antenna diversity status information" from the requesting mobile station, such as its number of transmit and receive antennas. Ex. 1003 ¶ 77, 125. If a mobile station has multiple transmit and receive antennas, it can communicate using a MIMO scheme, with the number of spatial paths limited by the number of antennas; if not, it must use some other scheme. *Id.* ¶¶ 62, 66, Fig. 3. Thus, we find that a person of ordinary skill in the art at the time of the alleged invention

would have understood that Wallace's mobile station initiated communication by sending a message that included antenna number information to the base station. Wicker Supp. Decl. ¶ 29.

Similarly, Wallace discloses also that the mobile station provides information on "the resources of the receiver" to a base station before initiation of communications when the receiver registers with the base station. Ex. 1003 ¶ 141. A person of ordinary skill reasonably would have understood this to include antenna number information. Wicker Supp. Decl. ¶ 28.

Patent Owner contends the transmission in Wallace of antenna number information by the terminal during registration does not meet this limitation. Reply 6. Patent Owner contends that the timing of this transmission does not correspond to sending a request to establish a link channel because those times "are usually different." *Id.* We do not agree with this argument. We find that Wallace meets this limitation because, to a person of ordinary skill, Wallace teaches providing antenna number information at the "initiation of a communication," e.g., "when the receiver registers with the base station." Opp. 7–8; Ex. 1003 ¶¶ 123, 127, 141; Wicker Supp. Decl. 28. Patent Owner's argument, and the testimony of its expert, Dr. Sharony (Sharony I Decl. ¶ 105; Sharony II Decl. ¶ 25), are contrary to the disclosure in Wallace.

Alternatively, Petitioner relies on Mayrand in combination with Wallace to meet this limitation. Opp. 13–14. According to Petitioner, "Mayrand disclosed a mobile station that identifies its capabilities and characteristics to the system (i.e., base station) in a request 'seeking access to a communication channel.'" *Id.* at 13. Relying on Dr. Wicker, Petitioner

contends “[a] skilled person would have applied Mayrand’s teachings in Wallace’s mixed mode system.” *Id.* at 14 (citing Wicker Supp. Decl. ¶¶ 49–50). Because we find that Wallace both discloses this limitation for determining anticipation, and reasonably suggests this limitation to a person of ordinary skill for determining obviousness, we do not find it necessary to reach Petitioner’s alternative argument based on Mayrand.

Therefore, we determine that Petitioner has demonstrated by a preponderance of the evidence that proposed substitute claim 7 is anticipated by Wallace and also would have been obvious to a person of ordinary skill based on Wallace.

7. Analysis of Proposed Substitute Claim 8

As Petitioner points out, proposed substitute claim 8 is “nearly identical to proposed claim 7.” Opp. 15. Neither Petitioner nor Patent Owner presents a separate element-by-element analysis for claim 8. Petitioner provides a brief discussion of two limitations of claim 8 that differ from claim 7. *Id.* at 15–16. Petitioner characterizes the first difference as “not substantive.” *Id.* at 16. For the second, which recites “a plurality of antennas constituting an array antenna,” Petitioner refers back to the Petition. *Id.*

Patent Owner responds that claim 8 is patentable “[f]or the same reasons discussed above as to substitute claim 7.” Reply 7. We find that there are no differences in the claims that would affect our previous analysis of proposed claim 7. We, therefore, adopt our previous analysis and findings for proposed substitute claim 8.

We have considered Petitioner’s additional remarks and find for the reasons given, Petitioner has demonstrated by a preponderance of the

evidence that each element of proposed substitute claim 8 is taught by Wallace, or alternatively, reasonably suggested by Wallace to a person of ordinary skill. Therefore, we determine that Petitioner has demonstrated by a preponderance of the evidence that the claim is anticipated by Wallace and, separately, that the subject matter of claim 8, as a whole, also would have been obvious to a person of ordinary skill based on Wallace.

8. Patent Owner's Additional Arguments

Patent Owner contends the “primary distinctions” are “Wallace does not teach: (a) transmitting the maximum number of spatial paths formable for multiplex communication; and (b) doing so in the initial request from the terminal to establish a link channel.” Reply 1. These primary arguments are addressed *supra*.

Patent Owner presents additional arguments on Wallace. *Id.* at 2–7. We have considered these arguments in reaching our conclusions on patentability of the substitute claims, but do not find them persuasive for the following reasons.

For example, Patent Owner suggests that Wallace is directed to “a methodology that is distinctly different than the spatial multiplexing to which the substitute claims are drawn.” Reply 2–3. We do not agree. For reasons discussed *supra*, we find that Wallace is from the same field of endeavor as the ’103 patent (wireless communication systems) and is at least “reasonably pertinent” to the claimed invention. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). Moreover, we find that to a person of ordinary skill, Wallace (like the ’103 patent) discloses spatial multiplexing. *See, e.g.*, Wicker Supp. Decl. ¶ 25 (“Wallace is similar to the ’103 patent because

Wallace also taught a scheme that uses several different spatial paths for multiplex communication.”).

Patent Owner contends Wallace teaches that the antenna number information transmitted from the remote terminal to the base station “is used only to determine a transmission scenario, i.e., the ‘type of configuration’ . . . for a link” Reply 3. In addition, Patent Owner argues “Wallace does not contain any teaching of the relationship between the specific number of antennas and the maximum number of spatial paths. In fact, Wallace does not contain any teaching of spatial paths.” *Id.* We do not find these arguments convincing. We find that for reasons given *supra*, Wallace teaches MIMO communication links where the number of antennas is used to determine the maximum number of independent channels (i.e., the maximum number of spatial paths) that can be formed by the terminal for multiplex communication. Ex. 1003 ¶¶ 66, 93; Wicker Supp. Decl. ¶ 26. Thus, we find that Wallace teaches a relationship between antennas and spatial paths: the maximum number of spatial paths formable by a terminal depends on the number of antennas at the terminal. *Id.* Further, we find that Wallace uses this information to determine “the maximum number of spatial paths formable.” *Id.*

Patent Owner further argues that “Wallace stores a fixed value of its actual number of antennas before transmitting the value to a base station in order to select a transmission scenario for spatial diversity communications. This fixed number of the actual number of antennas in the terminal does *not* represent the maximum number of spatial paths that can be formed for multiplex communication at the given time of an initial request to establish a link channel.” Reply 4. We do not find this argument convincing, as it is

contrary to the language of the proposed substitute claims. Those claims do not call for a “potentially changing parameter” or transmitting the actual number of paths formed (*cf.* Reply 4–5), only “a value indicating the maximum number of spatial paths *formable*.” Patent Owner does not dispute that the number of paths cannot exceed the number of antennas. *See* discussion *supra*.

E. Patentability of Proposed Substitute Claims 7 and 8 over Paulraj

As noted, Petitioner asserts that proposed substitute claims 7 and 8 are anticipated by and would have been obvious in light of Paulraj.¹² Opp. 16–24. Because we have already determined that Petitioner has demonstrated those claims are not patentable over Wallace, is it unnecessary for us to reach the remaining grounds of unpatentability proposed by Petitioner. *Cf. In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009) (not reaching other grounds of unpatentability after affirming a ground based on anticipation); *see also Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (an administrative agency is at liberty to reach a decision based on a dispositive issue).

¹² To meet certain limitations of the proposed substitute claims, Petitioner alternatively relies on the combination of Paulraj and Mukerjee and the combination of Paulraj, Mukerjee, and Mayrand. Opp. 19, 21–22.

F. Summary

In summary, based on the full record developed during trial, we conclude that Petitioner has demonstrated by a preponderance of the evidence that each limitation of proposed substitute claims 7 and 8 is disclosed by Wallace and that the claims are anticipated by Wallace. Petitioner has also demonstrated by a preponderance of the evidence that the subject matter of proposed claims 7 and 8 would have been obvious over Wallace at the time of the invention to a person of ordinary skill.

III. CONCLUSIONS

Based on the arguments and evidence presented during trial, Petitioner has demonstrated by a preponderance of the evidence that proposed substitute claims 7 and 8 are unpatentable under 35 U.S.C. §§ 102 and 103(a). Patent Owner's Motion to Amend is *granted* to the extent that it cancels original claims 1–6, and is otherwise *denied*.

A summary of our conclusions is set forth in the table reproduced below.

Motion to Amend Outcome	Claims
Original Claims Cancelled by Amendment	1–6
Substitute Claim Proposed in the Motion to Amend	7, 8
Substitute Claim: Motion to Amend Denied	7, 8

IV. ORDER

In consideration of the foregoing, it is
ORDERED that claims 1–6 of the '103 patent are *cancelled*;

FURTHER ORDERED that, because Petitioner has demonstrated that proposed substitute claims 7 and 8 are unpatentable, Patent Owner's Motion to Amend is *denied*; 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.

IPR2018-01371
Patent 7,962,103 B2

For PETITIONER:

Tyler R. Bowen
Bryan Banks
Chad Campbell (*Pro Hac Vice*)
James Young Hurt (*Pro Hac Vice*)
PERKINS COIE LLP
tbowen@perkinscoie.com
bbanks@perkinscoie.com
cscampbell@perkinscoie.com
jhurt@perkinscoie.com

For PATENT OWNER:

Henrik D. Parker
Timothy Devlin
Leonard Monfredo
Srikant Cheruvu (*Pro Hac Vice*)
DEVLIN LAW FIRM LLC
hparker@devlinlawfirm.com
TD-PTAB@devlinlawfirm.com
lmonfredo@devlinlawfirm.com
scheruvu@devlinlawfirm.com