

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUAWEI DEVICE USA, INC. and
ZTE (USA), INC.,
Petitioner,

v.

SPH AMERICA, LLC and ELECTRONICS AND
TELECOMMUNICATIONS RESEARCH INSTITUTE,
Patent Owner.

Case IPR2015-00221
Patent 8,565,346 B2

Before SALLY C. MEDLEY, BARBARA A. BENOIT, and
BETH Z. SHAW, *Administrative Patent Judges*.

BENOIT, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Huawei Device USA, Inc. and ZTE (USA), Inc. (collectively, “Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1, 23–25, 27–32, 34, 37, 38, and 40–42 (the “challenged claims”) of U.S. Patent No. 8,565,346 B2 (Ex. 1016, “the ’346 patent”). SPH America, LLC and Electronics and Telecommunications Research Institute (collectively, “Patent Owner”) filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). We have jurisdiction under 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

For the reasons that follow, we deny institution of an *inter partes* review.

A. Related Matters

Petitioner represents that the ’346 patent was asserted in various proceedings in the United States District Court for the Southern District of California. Pet. 1; *see* Paper 7, 2 (Patent Owner’s Notice of Related Matters). Petitioner has requested *inter partes* review of related patent¹ U.S. Patent No. 8,532,231 B2 (IPR2015-00203).

B. The ’346 Patent

The ’346 patent relates to techniques for increasing the rate of transmitting data in a wireless network, while maintaining compatibility

¹ U.S. Patent No. 8,532,231 B2 and the challenged patent both claim priority to the same family of patent applications, including Application No. 12/805,117, which issued as U.S. Patent No. 8,130,869.

with conventional wireless transmission protocols—specifically, while maintaining compatibility with the conventional IEEE 802.11a standard. Ex. 1016, 1:24–29, 42–45, 3:19–22. Rather than using a single antenna for wirelessly transmitting data as used in the conventional IEEE 802.11a standard, the ’346 patent describes using multiple antennas for transmission to achieve a higher data rate. *Id.* at 1:35–41, 45–47. As the ’346 patent indicates, previous systems using multiple antennas to provide a high speed data rate had not been compatible with conventional transmitting and receiving systems using the IEEE 802.11a standard. *Id.* at 3:8–10.

To maintain compatibility with the IEEE 802.11a standard in a multiple antenna system, the ’346 patent describes using the signal symbol portion of a conventional IEEE 802.11a frame in two particular ways. *Id.* at 3:54–63 (“Technical Solution” in the “Summary of the Invention” section). First, the signal symbol portion includes a “transmit mode identifier” that indicates whether the transmit mode of the frame is a conventional “single antenna transmit mode” or a multiple antenna mode—more specifically, “a multiple-input/multiple-output (MIMO) mode.” *Id.* at 3:54–57. Second, the reserved bit of the signal symbol portion of a conventional IEEE 802.11a frame is used to indicate which of two MIMO methods—a spatial division multiplexing (SDM) method or a space-time block code (STBC) encoding method—is used for the transmission of the frame. *Id.* at 3:58–63; *see id.* at 10:43–46 (describing SDM and STBC as methods in a MIMO system).

C. Challenged Claims

Of the challenged claims, claims 1, 23, 30, and 37 are independent. Claim 23, reproduced below, is illustrative of the claimed subject matter:

23. A transmitting apparatus in a wireless communication system, the apparatus comprising:
- a frame generator configured to generate a frame comprising:
 - a short preamble comprising synchronization information,
 - a first and a second long preambles subsequent to the short preamble,
 - a signal symbol positioned between the first long preamble and the second long preamble, wherein the signal symbol comprises information about space time block coding, and
 - a data field positioned subsequent to the second long preamble;
 - and
 - a transmitter configured to transmit the frame to a receiver.

Ex. 1016, 16:60–17:7.

D. Asserted Grounds of Unpatentability

Petitioner contends the challenged claims are unpatentable under 35 U.S.C. § 103(a) as obvious over the following references (Pet. 3–4):

References	Claims Challenged
Narasimhan ² and Alamouti ³	23 and 30
Narasimhan, Alamouti, and IEEE 802.11a Standard ⁴	24, 25, 31,32, 37, and 38
Narasimhan, Alamouti, IEEE 802.11a Standard, and Aoki ⁵	27–29, 34, and 40–42

² U.S. Patent No. 7,577,085 B1, issued Aug. 18, 2009, filed July 5, 2002 (Ex. 1009) (“Narasimhan”). The parties refer to this reference as “N’085.”

³ S. M. Alamouti, “A Simple Transmit Diversity Technique for Wireless Communications,” 16 IEEE J. ON SELECT AREAS IN COMMUNICATIONS 1451 (1998) (Ex. 1003) (“Alamouti”).

⁴ IEEE Standard 802.11a (1999) (Ex. 1010).

References	Claims Challenged
Narasimhan, Alamouti, IEEE 802.11a Standard, and Gummadi ⁶	1, 27, 34, and 40
Liu ⁷ and Jeon ⁸	23 and 30
Liu, Jeon, and IEEE 802.11a Standard	24, 25, 31,32, 37, and 38
Liu, Jeon, IEEE 802.11a Standard, and Aoki	27–29, 34, and 40–42

II. ANALYSIS

We turn to Petitioner’s asserted grounds of unpatentability to determine whether Petitioner has met the threshold of 35 U.S.C. § 314(a). A ground of unpatentability can be instituted only if the petition supporting the ground demonstrates there is a reasonable likelihood that at least one challenged claim is unpatentable. 37 C.F.R. § 42.108(c).

A. *Real Party-In-Interest*

Section 312(a) of Title 35 of the United States Code provides that a petition for *inter partes* review under 35 U.S.C. § 311 may be considered

⁵ Aoki, et al., “New preamble structure for AGC in a MIMO-OFDMsystem,” IEEE 802.11-04/046r1, Jan. 2004 (Ex. 1008) (“Aoki”). Petitioner asserts this reference is “a presentation given by employees of [a particular corporation] . . . to the IEEE in January 2004.” Pet. 8.

⁶ U.S. Patent Application Publication No. 2005/0054313 A1, published Mar. 10, 2005, filed Mar. 29, 2004 (Ex. 1011) (“Gummadi”).

⁷ Liu & Li, “A MIMO System with Backwards Compatibility for OFDM based WLANs,” 4th IEEE Workshop on Signal Processing Advances in Wireless Communications, 2003 (Ex. 1012) (“Liu”).

⁸ Jeon, et al., “Optimal Combining of STBC and Spatial Multiplexing for MIMO-OFDM,” IEEE 802.11-03/0513r0, July 2003 (Ex. 1006) (“Jeon”). Petitioner asserts these slides were “submitted to IEEE on July 2003.” Pet. 7.

only if, among other things, the petition identifies all real parties-in-interest. 35 U.S.C. § 312(a)(2). Whether a non-identified party is a real party-in-interest to a proceeding is a highly fact-dependent question. *Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,759 (Aug. 14, 2012) (“*Trial Practice Guide*”) (citing *Taylor v. Sturgell*, 553 U.S. 880 (2008)). “Courts invoke the terms ‘real party-in-interest’ and ‘privy’ to describe relationships and considerations sufficient to justify applying conventional principles of estoppel and preclusion.” *Id.* *Taylor* lists six categories that create an exception to the common law rule that normally forbids non-party preclusion in litigation. *Taylor*, 553 U.S. at 893–95. “A common consideration is whether the non-party exercised or could have exercised control over a party’s participation in a proceeding.” *Trial Practice Guide*, 77 Fed. Reg. at 48,759 (citing *Taylor*, 553 U.S. at 895).

Factors for determining actual control or the opportunity to control include existence of a financially controlling interest in the petitioner. *Rules of Practice for Trials Before the Patent Trial and Appeal Board and Judicial Review of Patent Trial and Appeal Board Decisions; Final Rule*, 77 Fed. Reg. 48,612, 48,617 (Aug. 14, 2012). Additional relevant factors include: the non-party’s relationship with the petitioner; the non-party’s relationship to the petition itself, including the nature and/or degree of involvement in the filing; and the nature of the entity filing the petition. *Trial Practice Guide*, 77 Fed. Reg. at 48,760.

The Petition names ZTE (USA), Inc. (“ZTE (USA)”) as a real party-in-interest. Pet. 1. Patent Owner argues that ZTE (USA)’s parent company, ZTE Corporation, also is a real party-in-interest. Prelim. Resp. 28–30. In particular, Patent Owner argues that assertions made jointly by ZTE

Corporation and ZTE (USA) during a related district court case are sufficient to show that ZTE Corporation is a real party-in-interest for purposes of this proceeding. *Id.*

We have considered the reasoning and evidence to which we are directed in support of Patent Owner’s arguments—a joint motion for dismissal of ZTE Corporation from the related case. Ex. 2005 (“joint motion” or “evidence”). We disagree with Patent Owner that the joint motion tends to show that ZTE Corporation has an interest in this proceeding. We find the joint motion to be ambiguous. Patent Owner relies on the joint motion to show that ZTE Corporation and ZTE (USA) made mutual representations regarding party responsibility for infringement, and that ZTE Corporation and ZTE (USA) shared information and documents during the related case. Prelim. Resp. 28–29. The joint motion, however, also represents ZTE Corporation’s dismissal from the case, seemingly representing that ZTE Corporation and ZTE (USA) have nonaligned interests with respect to the related case. The joint motion is not persuasive evidence to show that ZTE Corporation exercised or could have exercised control over the IPR petition drafting and filing as Patent Owner asserts.

The Petition also names Huawei Device USA, Inc. (“Huawei USA”) as a Petitioner real party-in-interest. Pet. 1. Patent Owner argues that Huawei Technologies Co., Ltd. (“Huawei Tech.”), Futurewei Technologies, Inc. (“Futurewei Tech.”), and Shenzhen Huawei Investment and Holding Co., Ltd. (“Shenzhen”) also are real parties-in-interest. Prelim. Resp. 30–31. In particular, Patent Owner argues that because Huawei Tech. and Futurewei Tech. are co-defendants with Huawei USA in a related district court case (“the related case”), they all have a common interest in the instant challenges

brought by Petitioner. *Id.* at 30. Patent Owner additionally argues that because Huawei USA, Huawei Tech., and Futurewei Tech. are each subsidiaries of Shenzhen, Shenzhen also should be included as a real party-in-interest. *Id.* at 30–31.

There is little to no reasoning or evidence of record to suggest that Shenzhen should be named a real party-in-interest. We have considered Exhibit 2006, which is the defendants’ answer to the complaint filed in the related case. Ex. 2006. Patent Owner relies on Exhibit 2006 to show that Shenzhen, who is not involved in the related case, is the parent company to all of the other companies mentioned therein. But Exhibit 2006 describes Huawei USA, Huawei Tech., and Futurewei Tech. as “indirect” subsidiaries. We do not know, based on the record before us, what relationship constitutes an “indirect” one, and Patent Owner does not explain the relationship status in that regard. In any event, even if Huawei USA, Huawei Tech., and Futurewei Tech. are “direct” subsidiaries of Shenzhen, that alone does not make Shenzhen a real party-in-interest of this proceeding. Patent Owner has not shown that Shenzhen controlled, or could have controlled, the proceeding. Patent Owner’s arguments with respect to Shenzhen being a real party-in-interest are tenuous.

The same Exhibit 2006 also is relied on by Patent Owner to show that Huawei Tech. and Futurewei Tech., by status of being co-defendants with Huawei USA in the related case, should be named as real parties-in-interest in this proceeding. Being a co-defendant in a related case does not, without more, establish control or the ability to control a proceeding. For all of these reasons, we determine that Patent Owner has not shown that Petitioner has failed to name all real parties-in-interest.

B. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable constructions in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *see Trial Practice Guide*, 77 Fed. Reg. at 48,766. Under the broadest reasonable construction standard, claim terms are presumed to be given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor may provide a meaning for a term that is different from its ordinary meaning by defining the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

We construe space-time block coding in view of these principles. We have considered the other claim terms that Petitioner identified for construction, and the Patent Owner's response to Petitioner's proposed constructions. *See* Pet. 9–11; Prelim. Resp. 10–17. We have determined that no other terms in the challenged claims require express construction for this decision.

space-time block coding

Independent claims 1, 23, 30, and 37 recite “space-time block coding.” Petitioner contends, relying on the Declaration of Tim A. Williams, Ph.D. (Ex. 1002) for support, that space-time block coding (i.e., STBC) is a term of art in telecommunications, and then describes a space-time block coding system. Pet. 10 (citing Ex. 1002 ¶ 91). As Patent Owner observes, Petitioner does not propose a construction for the term

space-time block coding. Prelim. Resp. 14. Nor does Patent Owner propose a construction. *See id.* at 14–17 (rebutting Petitioner’s proposed construction of space-time block coding). Although not presented in the Petition, Petitioner’s declarant asserts that “one of skill in the art would understand the term ‘space-time block coding’ to mean, in the context of the . . . ’346 patent[], using block codes to encode a data stream, copies of which are transmitted over multiple antennas.” Ex. 1002 ¶ 91.

The ’346 patent does not set forth a special definition for “space-time block coding.” The ’346 patent describes “space-time block coding” or STBC in the context of how it is used, which is consistent with Dr. Williams’s conclusory testimony. For example, concerning the transmission over multiple antennas, the ’346 patent is directed to using multiple antennas for transmission to achieve a higher data rate, rather than using a single antenna for wirelessly transmitting data as used in the conventional IEEE 802.11a protocol. Ex. 1016, 1:35–41, 45–47.

The ’346 patent also describes space-time block coding as a way to encode data for transmission. For example, the ’346 patent describes “encod[ing] STBC, an STBC encoder, and an STBC decoder.” *Id.* at 4:9, 7:15–18; *see also id.* at 11:18–21 (determining “whether the transit mode is the SDM-OFDM or the STBC-OFDM, and restores the transmit data after a proper demodulation process according to the determined mode”). The ’346 patent contrasts space-time block coding with another method that can be used in MIMO systems—spatial division multiplexing (“SDM”). *Id.* at 3:60–63, 10:43–46 (determining whether the transmit mode in a multiple antenna transmit system (i.e., MIMO) is the SDM mode or the STBC mode); *see id.* at 7:4 (defining SDM as an acronym for spatial division

multiplexing). Thus, space-time block coding, in the context of the '346 patent, is a method that uses block codes to encode a data stream for transmission over multiple antennas in a MIMO system.

C. Asserted Grounds of Obviousness Relying on Narasimhan and Alamouti

Petitioner contends the challenged claims all would have been obvious under § 103 over the combination of Narasimhan and Alamouti, either over the combination alone or over the combination and various other references. Pet. 11–42. To support these contentions, Petitioner provides explanations and claim charts specifying where claim limitations purportedly are disclosed or suggested in the references, and why one skilled in the art would combine the references. *Id.* Petitioner also cites the Declaration of Dr. Williams for support. *Id.* Patent Owner challenges Petitioner's contentions regarding Narasimhan and Alamouti. Prelim. Resp. 31–42, 47–54.

We determine that the information presented by Petitioner fails to establish a reasonable likelihood that any of the challenged claims are unpatentable under 35 U.S.C. § 103 as obvious over Narasimhan and Alamouti for the reasons that follow.

1. Narasimhan

Narasimhan describes techniques for addressing the problem that the IEEE 802.11a standard “do[es] not account for transmit diversity,” and Narasimhan recognized that “it would be advantageous to incorporate transmit diversity in a wireless transmission system that is backwards compatible with the IEEE 802.11a . . . standards.” Ex. 1009, 2:6–12. To do

so, Narasimhan describes a novel frame format that is compliant with the preamble of the IEEE 802.11a standard.⁹ *Id.* at 4:58–64.

Narasimhan’s frame format includes a signal field which immediately follows the standards-compliant preamble, and generally is similar to the signal field of the IEEE 802.11a standard. *Id.* at 4:66–5:2. In contrast to the IEEE 802.11a standard, Narasimhan’s signal field, however, also uses the reserved bit of the IEEE 802.11a standard signal field to indicate whether the data packet follows the diversity data packet format used when two antennas are used to transmit. *Id.* at 5:2–18, 9:27–32; *see id.* at Fig. 2 (showing Narasimhan’s data packet format). The reserved bit is referred to as a “transmission diversity” flag (or semaphore) or as “TXDIV flag.” *Id.* at 4:5–13, 5:2–6, 9:27–32. Using the reserved bit of the signal field, according to Narasimhan, allows IEEE 802.11a standard-compliant transceivers to be used. *Id.* at 5:6–15; *see also id.* at 9:4–34 (describing a receiver processing the received signal in accordance with the IEEE 802.11a standard unless the transmit diversity flag has been set).

2. Alamouti

Alamouti describes a transmit diversity technique using two transmit antennas and one receive antenna for wireless communications. Ex. 1003, Abstract. Two signals are transmitted simultaneously from two antennas, and “encoding is done in space and time.” *Id.* at 3. Alamouti also indicates that “[t]he encoding, however, may also be done in space and frequency.” *Id.*

⁹ To be more precise, the novel packet format is compliant with the Physical Layer Control Protocol (“PLCP”) preamble of the IEEE 802.11a standard. Ex. 1009, 3:42–48, 4:62–64.

3. *The Challenged Claims*

Petitioner, relying on testimony from its declarant, contends that Narasimhan teaches or suggests all of the features recited by independent claim 23, except for space-time block coding, which is taught by Alamouti. Pet. 11–14. Petitioner also contends that one of ordinary skill in the art would have had reason to combine Narasimhan’s techniques for transmission diversity with the space-time block coding of Alamouti. Pet. 12 (citing Ex. 1002 ¶¶ 139–43). Patent Owner challenges Petitioner’s contentions. Prelim. Resp. 31–41.

A dispositive issue concerns “the signal symbol comprises information about space time block coding,” recited in independent claim 23. For this feature, Petitioner relies on the combination of Narasimhan’s disclosure of a signal field that indicates “the data packet follows a ‘diversity data packet format’” and Alamouti’s express disclosure of space-time coding. Pet. 13–14.

First, Petitioner concludes, from Alamouti’s express disclosure of space-time coding, that “Alamouti . . . describes space-time *block* coding.” Pet. 12 (emphasis added), 14. Petitioner cites to the Declaration of Dr. Williams for this proposition. Pet. 12 (citing Ex. 1002 ¶¶ 139–43). Dr. Williams asserts, without providing further explanation or support, that Alamouti “is considered the first description of space-time block coding (STBC), Alamouti’s technique was later coined ‘space-time block coding’ and Alamouti is considered the ‘father’ of STBC.” Ex. 1002 ¶ 140. “Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.” 37 C.F.R. § 42.65. We weigh Dr. Williams’s testimony accordingly. *In re Am. Acad. of Sci. Tech*

Ctr., 367 F.3d 1359, 1368 (Fed. Cir. 2004) (“[T]he Board is entitled to weigh the declarations and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations.”).

Petitioner’s distinction between space-time coding and space-time block coding in an asserted ground further undermines Petitioner’s position regarding Alamouti’s express disclosure of space-time coding. *See* Pet. 43 (combining Jeon’s disclosure of “using block coding with space-time coding” with Liu’s express disclosure of “space-time coding,” in asserting claim 23 would have been obvious over Liu and Jeon, because Liu does not disclose expressly “using block coding”).

Second, even if one ordinarily skilled in the art at the time of the invention would have understood Alamouti to have conveyed space-time block coding, we are not persuaded that Petitioner’s proposed combination of the general notion of space-time block coding with Narasimhan’s signal field that indicates a particular format of a data packet would have conveyed to a person of ordinary skill in the art “a signal symbol . . . compris[ing] information about space time block coding,” as recited in claim 23.

Petitioner has not identified in either Narasimhan or Alamouti a frame that includes information about space-time block coding. Rather, Petitioner relies on Narasimhan’s disclosure and Alamouti’s general disclosure of space-time block coding. More specifically, Petitioner relies on Dr. Williams’s testimony to conclude:

Hence, exactly as Claim 23, [Narasimhan] determines transmission diversity, *e.g.*, use of MIMO transmitters, based on information in the “signal symbol.”

Pet. 14 (citing Ex. 1002 ¶ 132). Claim 23, however, does not require that transmission diversity be determined. Rather, claim 23 requires a frame

generator configured to generate a frame comprising “a signal symbol . . . compris[ing] information about space time block coding.” For the reasons previously discussed in Section II.B, space-time block coding, in the context of the ’346 patent, is a block encoding method that can be used in a MIMO system. The ’346 patent itself indicates, however, that STBC is not used necessarily by all MIMO systems. *See* Ex. 1016, 3:60–63, 10:43–46 (determining whether SDM or STBC is used in a MIMO transmission). Thus, determining transmission diversity, or use of MIMO transmitters, based on information in a signal symbol, is insufficient to disclose “a signal symbol . . . compris[ing] information about space time block coding,” as recited in claim 23. Nor does Petitioner provide sufficient explanation or evidence that Narasimhan’s disclosure would have suggested a signal symbol comprising information about space time block coding.

Even if a person of ordinary skill in the art would have recognized that the combination of Narasimhan and Alamouti would have conveyed the concept of a signal symbol comprising information about space time block coding, Petitioner does not provide sufficient explanation or evidence why one ordinarily skilled in the art would have substituted an indicator of an encoding method (i.e., space-time block coding) for Narasimhan’s indicator of a data packet format. *KSR v. Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–19 (“[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.”). Thus, Petitioner has not shown that one of

ordinary skill would have combined Alamouti's alleged general notion of space-time block coding with Narasimhan's signal field that indicates a particular format of a data packet, to arrive at the claimed invention that includes "a signal symbol [including] information about space time block coding," as recited in claim 23.

Third, the Petition falls short of providing articulated reasoning with rational underpinning to support a legal conclusion that the subject matter of claim 23 would have been obvious to one of ordinary skill in the art in view of what Narasimhan and Alamouti would have conveyed about space-time block coding to a person of ordinary skill in the art. *KSR*, 550 U.S. at 418 ("[R]ejections on obviousness grounds 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.") (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Petitioner contends that both space frequency encoding and space-time block coding were known in the art and that one skilled in the art "would appreciate the ability to select either space frequency encoding or space-time block coding." Pet. 12. Based on this reason and citing Dr. Williams's testimony, Petitioner concludes "[a]ccordingly, one of skill in the art would have been motivated to combine the [Narasimhan] reference with the space-time block coding of Alamouti." *Id.* (citing Ex. 1002 ¶¶ 139–43).

Dr. Williams's testimony cited by Petitioner, however, does not support Petitioner's contention that one ordinarily skilled in the art "would have been motivated to combine" the references. *See generally* Ex. 1002 ¶¶ 139–43. Rather, Dr. Williams testifies that one skilled in the art "would appreciate the ability to select either space frequency encoding or space-time

block coding” (*id.* at ¶ 142); “would have recognized that the space-frequency encoding in [Narasimhan] could be replaced with the space-time block coding described in Alamouti” (*id.*); and “would have recognized the benefit of using space-time block coding in Alamouti with the system described in the [Narasimhan] reference,” without sufficiently articulating what the benefit of using space-time block coding would have been (*id.* at ¶ 143). None of that testimony indicates sufficiently why one ordinarily skilled in the art would have had reason to combine the references in the manner claimed. Accordingly, Dr. Williams’s testimony does not provide support for a sufficient reason why one skilled in the art would have combined the references in the manner claimed, including a signal symbol including information about space-time block coding, as required by claim 23. *KSR*, 550 U.S. at 418 (“a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art”).

Thus, without sufficient support from Dr. Williams, Petitioner’s rationale for modifying Narasimhan’s system with Alamouti’s alleged space-time block coding, essentially, is that space-time block coding was known in the art. Pet. 12. Implementing known elements to yield predictable results and improve similar devices in the same way generally is obvious unless the actual application is beyond the level of ordinary skill in the art. *See KSR*, 550 U.S. at 416–17. Petitioner, however, does not allege, much less support sufficiently, that Petitioner’s proposed combination would have yielded predictable results or how Alamouti’s alleged space-time block coding would have improved Narasimhan’s system.

For these reasons, we determine that the information presented by Petitioner fails to establish a reasonable likelihood that it would prevail in showing independent claim 23 or its dependent claims 24, 25, 27, 28, and 29 are unpatentable over Narasimhan and Alamouti.

Similarly, each of the other independent claims—claims 1, 30, and 37—require a signal symbol including information about space time block coding. Ex. 1016, 14:39–42 (claim 1), 17:42–45 (claim 30), 18:24–27 (claim 37). Petitioner relies on Narasimhan and Alamouti and makes arguments for the information about space-time block coding in claims 1, 30, and 37 similar to those it advanced with regard to claim 23. Pet. 16 (claim 30), 24 (claim 37), 28–29 (claim 1).

For the reasons articulated with regard to claim 23, we determine that the information presented by Petitioner fails to establish a reasonable likelihood that it would prevail in showing independent claims 1, 30, and 37, or dependent claims 31, 32, 34, 38, and 40–42, are unpatentable over Narasimhan, Alamouti, and in combination with other references.

D. Asserted Grounds of Obviousness Relying on Liu and Jeon

Petitioner contends the challenged claims all would have been obvious under § 103 over the combination of Liu and Jeon, either over the combination alone or over the combination and various other references. Pet. 42–59. To support these contentions, Petitioner provides explanations and claim charts specifying where claim limitations purportedly are disclosed or suggested in the references, and why one skilled in the art would have combined the references. *Id.* Petitioner also cites the Declaration of Dr. Williams (Ex. 1002) for support. *Id.* Patent Owner

challenges Petitioner's contentions regarding Liu and Jeon. Prelim. Resp. 42–54.

We determine that the information presented by Petitioner fails to establish a reasonable likelihood that any of the challenged claims are unpatentable under 35 U.S.C. § 103 as obvious over Liu and Jeon for the reasons that follow.

1. Liu

Liu describes techniques for improving the data rate of a conventional wireless communication system based on the IEEE 802.11a standard. Ex. 1012, 130¹⁰ (Abstract). To accomplish that goal, Liu describes modifying the preamble of the IEEE 802.11a packet structure to support MIMO transmitters and receivers, while maintaining backward compatibility with the unmodified IEEE 802.11a packet structure. *Id.* Among other techniques, Liu describes using the reserved bit of the signal field in a conventional IEEE 802.11a frame “to distinguish the MIMO from SISO transmissions.” *Id.* at 131 (§ 2.1). Liu also describes using a particular MIMO wireless communication scheme that uses the IEEE 802.11a standard and a space-time coding scheme. *Id.* at 130 (§§ 1, 2.1) (describing Bell-labs' LAYered Space-Time (i.e., “BLAST”) system).

2. Jeon

Jeon is titled “Optimal Combining of [Space-Time Block Coding] and Spatial Multiplexing for [Multiple Antenna Systems using Orthogonal

¹⁰ In citing to Liu, we use the original page numbering of the article.

Frequency-Division Multiplexing¹¹].” Jeon indicates space-time block coding involves a “[s]impler implementation than” another type of coding—trellis coding.

3. *Whether Jeon is Prior Art*

As an initial matter, an *inter partes* review may only include “a ground that could be raised under section 102 or 103 and only on the basis of prior art consisting of patents or printed publications.” 35 U.S.C. § 311(b). On its face, Jeon neither appears to be a patent nor a printed publication. Jeon is a collection of fourteen pages that appear to be formatted as a slide presentation and do not appear to be pages of a patent or printed publication. *See* Ex. 1006. The pages of Jeon each include a header that presumably identifies it as a document related to the IEEE 802.11 standard and a date “July 2003.” *See, e.g.,* Ex. 1006, 1 (indicating “doc.: IEEE 802.11-03/0513r0”). The pages of Jeon also include a footer identifying the document as a submission. *See, e.g., id.* (stating “Submission”).

Petitioner contends that the “Jeon Reference was submitted to IEEE” prior to the earliest claimed effective filing date of the ’346 patent (Pet. 7), which is consistent with the document itself. Petitioner, however, does not offer further arguments or evidence that Jeon is a patent or printed publication under 35 U.S.C. § 102(b). A “printed publication” under § 102(b) “has been interpreted to mean that before the critical date the reference must have been sufficiently accessible to the public interested in the art; dissemination and public accessibility are the keys to the legal

¹¹ *See* Ex. 1012, 130 (Abstract) (indicating OFDM is an acronym for orthogonal frequency-division multiplexing).

determination whether a prior art reference was ‘published.’” *In re Cronyn*, 890 F.2d 1158, 1160 (Fed. Cir. 1989) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1568 (Fed. Cir. 1988)).

Even if we were to consider the testimony of the Williams Declaration that asserts “Jeon is an IEEE presentation submitted to the high throughput study group” (Ex. 1002 § 155), which is not cited by the Petition, Petitioner does not present sufficient facts and circumstances around the reference’s disclosure to members of the public to conclude that the reference is a printed publication. *See In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004) (indicating that the determination of whether a reference qualifies as a printed publication “involves a case-by-case inquiry into the facts and circumstances surrounding the reference’s disclosure to members of the public”); *see also SRI Int’l, Inc. v. Internet Sec. Sys. Inc.*, 511 F.3d 1186 (Fed. Cir. 2008) (vacating and remanding grant of summary judgment due to issues of material fact as to whether second submitted paper was publicly accessible). For this reason alone, we determine that the information presented by Petitioner fails to establish a reasonable likelihood that it would prevail on this challenge.

4. Independent Claim 23 and Dependent Claims 24, 25, 27, 28, and 29

Alternatively, even assuming Jeon is prior art, we are not persuaded that Petitioner has established a reasonable likelihood it would prevail in this asserted ground. Petitioner, relying on testimony from Dr. Williams, contends that Liu teaches or suggests all of the features recited by independent claim 23, except for space-time block coding, which is taught by Jeon. Pet. 42–46. More specifically, Petitioner relies on Liu’s disclosure

of modifying the IEEE 802.11a packet structure to support MIMO transmitters and receivers, while maintaining backward compatibility with the unmodified IEEE 802.11a packet structure. *Id.* at 42–43.

For “a signal symbol . . . compris[ing] information about space time block coding” cited by claim 23, Petitioner relies on a combination of Liu and Jeon. Petitioner has not identified in either Liu or Jeon a signal symbol that includes information about space-time block coding. Rather, Petitioner relies on Liu’s disclosure that the reserved bit of the signal field in an IEEE 802.11a frame “can be used to distinguish the MIMO from SISO transmissions,” and on Liu’s disclosure of space-time coding. *Id.* at 43–44. Because Liu does not disclose expressly “using block coding,” Petitioner contends Jeon’s alleged disclosure of “using block coding with space-time coding” with Liu’s express disclosure of “space-time coding” discloses or suggests “a signal symbol . . . compris[ing] information about space time block coding,” recited in claim 23. *Id.* at 44.

Petitioner further contends that one of ordinary skill in the art would have had reason to use Jeon’s space-time block coding with Liu’s space-time coding “to create a less complex MIMO coding system.” *Id.* (citing 1002 ¶¶ 158–59). Patent Owner challenges Petitioner’s contentions. Prelim. Resp. 42–46.

We are not persuaded that Petitioner’s proposed combination of Jeon’s space-time block coding with Liu’s space-time coding, along with Liu’s reserved bit of the signal field in an IEEE 802.11a frame to distinguish a multiple antenna transmission from a single antenna transmission (disclosed in Liu), properly accounts for “a signal symbol . . . compris[ing] information about space time block coding,” as recited in claim 23.

Petitioner does not adequately address this critical issue. *See generally* Pet. 42–45. Rather, Petitioner articulates a reason for generally combining Liu’s system with Jeon’s disclosure of space-time block coding—that is, because a multiple antenna system could be implemented more simply. *Id.* at 43. We agree with Patent Owner that Petitioner does not explain adequately the relevance of Jeon’s statement, such as explaining how Liu’s BLAST coding uses the inferior coding scheme (trellis coding) mentioned in Jeon, or explaining how Jeon’s statement is relevant to a comparison between space-time block coding and Liu’s space-time coding scheme (BLAST). Prelim. Resp. 43. Petitioner’s contention in large measure amounts to demonstrating that space-time block coding was known in the prior art, which is not sufficient. *KSR*, 550 U.S. at 418 (holding that obviousness cannot be established “merely by demonstrating that each of the elements was, independently, known in the prior art”).

Further, Petitioner does not explain sufficiently, much less provide supporting evidence, how substituting space-time block coding for Liu’s space-time coding would have prompted a person of ordinary skill to combine the elements in the way the claimed invention does. *Id.* at 418–19 (“[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.”). Petitioner has not addressed sufficiently why one of ordinary skill in the art would have modified Liu’s use of the reserved bit to distinguish multiple antenna transmissions from single

antenna transmissions to use the reserved bit to include information about an encoding scheme that can be used in multiple antenna transmissions (i.e., space-time block coding). *See* Ex. 1016, claim 23 (“a signal symbol . . . compris[ing] information about space time block coding”) Thus, Petitioner has not articulated sufficiently why one ordinarily skilled in the art would have found the subject matter in claim 23 as a whole obvious in view of Liu and Jeon.

For the foregoing reasons, we determine that the information presented by Petitioner fails to establish a reasonable likelihood that it would prevail in showing independent claim 23 or its dependent claims 24, 25, 27, 28, and 29 are unpatentable over Liu and Jeon.

5. Remaining Challenged Claims

Similar to independent claim 23, each of the other independent claims—claims 1, 30, and 37—require a signal symbol including information about space time block coding. Ex. 1016, 14:39–42 (claim 1), 17:42–45 (claim 30), 18:24–27 (claim 37). Petitioner relies on Liu and Jeon and makes arguments for the information about space-time block coding in claims 1, 30, and 37 similar to those it advanced with regard to claim 23. Pet. 45 (claim 30), 49 (claim 37), 53 (claim 1).

For the reasons articulated with regard to claim 23, we determine that the information presented by Petitioner fails to establish a reasonable likelihood that it would prevail in showing independent claims 1, 30, and 37, or dependent claims 31, 32, 34, 38, and 40–42, are unpatentable over Liu, Jeon, and in combination with other references.

III. CONCLUSION

For the foregoing reasons, we conclude that there is not a reasonable likelihood that Petitioner would prevail in showing that claims 1, 23–25, 27–32, 34, 37, 38, and 40–42 of the '346 patent are unpatentable.

IV. ORDER

Upon consideration of the record before us, it is
ORDERED that the Petition is denied as to all challenged claims, and
no trial is instituted.

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