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Paper 9
Date: October 20, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

APEX BEAM TECHNOLOGIES LLC,
Patent Owner.

IPR2023-00599
Patent 10,912,081 B2

Before JOHN D. HAMANN, SEAN P. O'HANLON, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

HAMANN, Administrative Patent Judge.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

APPLE 1032

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Petitioner") filed a petition for *inter partes* review of claims 1–12 of U.S. Patent No. 10,912,081 B2 (Ex. 1001, "the '081 patent"). Paper 1 ("Pet."). Apex Beam Technologies LLC ("Patent Owner") filed a Preliminary Response. Paper 7 ("Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 (2018) and 37 C.F.R. § 42.4(a) (2022). An *inter partes* review may be instituted if "the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a).

Upon consideration of the papers, we determine that the information presented in the Petition demonstrates that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one challenged claim of the '081 patent.

A. Real Parties-In-Interest

The parties identify themselves as the real parties-in-interest. Pet. 85; Paper 5, 2.

B. Related Matters

The parties identify *Apex Beam Technologies LLC v. Samsung Electronics Co.*, No. 2:22-cv-00188 (E.D. Tex.) ("the related district court litigation"); *Apex Beam Technologies LLC v. ZTE Corp.*, No. 2:22-cv-00031 (E.D. Tex.); *Apex Beam Technologies LLC v. OnePlus Technology (Shenzhen) Co.*, No. 2:22-cv-00032 (E.D. Tex.); and *Apex Beam*

Technologies LLC v. TCT Mobile Int'l Ltd., No. 2:21-cv-00438 (E.D. Tex.) as matters that may affect, or be affected by, a decision in this proceeding. Pet. 85; Paper 5, 3.

C. The '081 Patent

The '081 patent "relates to transmission schemes of radio signals in wireless communication systems, and in particular to . . . multi-antenna transmission." Ex. 1001, 1:17–20. As background, the '081 patent explains that in Massive Multi-Input Multi-Output (MIMO), "multiple antennas experience beamforming to form a relatively narrow beam which points to a particular direction to improve the quality of communication." *Id.* at 1:26–29. According to the '081 patent, others previously proposed "to increase the robustness of transmission [by] using a relatively wide beam transmitting Physical Downlink Control Channel (PDCCH) and to increase the Signal-to-Noise Ratio (SNR) using a relatively narrow beam transmitting Physical Downlink Shared Channel (PDSCH)." *Id.* at 1:34–39. The '081 patent adds that it was also previously proposed "to use the PDCCH to cross-slot indicate the transmission beam of the PDSCH, so as to solve the problem of delay between a User Equipment (UE) acquiring the transmission beam of the PDSCH from the PDCCH and conducting PDSCH receiving using the beam information indicated by the PDCCH." *Id.* at 1:39–45.

According to the '081 patent, however, "cross-slot beam indication would result in reduction of dynamic of beam information, increase of overhead of control signaling, reduction of dynamic of scheduling, and other problems." *Id.* at 1:49–53. For example, "[a] UE with high processing capacity can decode the PDCCH in a short time to obtain beam information

that is used for receiving the PDSCH that is in the time slot of the PDCCH, and adjust a receiving beam to receive a multicarrier symbol in which the PDSCH is located." *Id.* at 1:53–58. "However, the delay in PDSCH transmission caused by decoding PDCCH would result in underutilization of system resources," according to the '081 patent. *Id.* at 1:58–60.

In response, the '081 patent discloses embodiments that address these problems. *Id.* at 1:61–62. The '081 patent discloses for one such embodiment that "if the time-domain resource occupied by [a] given multicarrier symbol is before [a] first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal," which "is advantageous in that the delay in the receiving of the first radio signal resulted from the delay in the decoding of the second radio signal is avoided." *Id.* at 4:19–23, 4:27–31. Put differently, the '081 patent discloses that "the PDSCH receives the multicarrier symbol of the PDSCH before the first time point using the same beam used for receiving the PDCCH, thereby avoiding the problem of the delay in PDSCH transmission resulted from the delay in PDCCH decoding." *Id.* at 4:32–37.

Figure 7, shown below, illustrates an embodiment of the '081 patent.

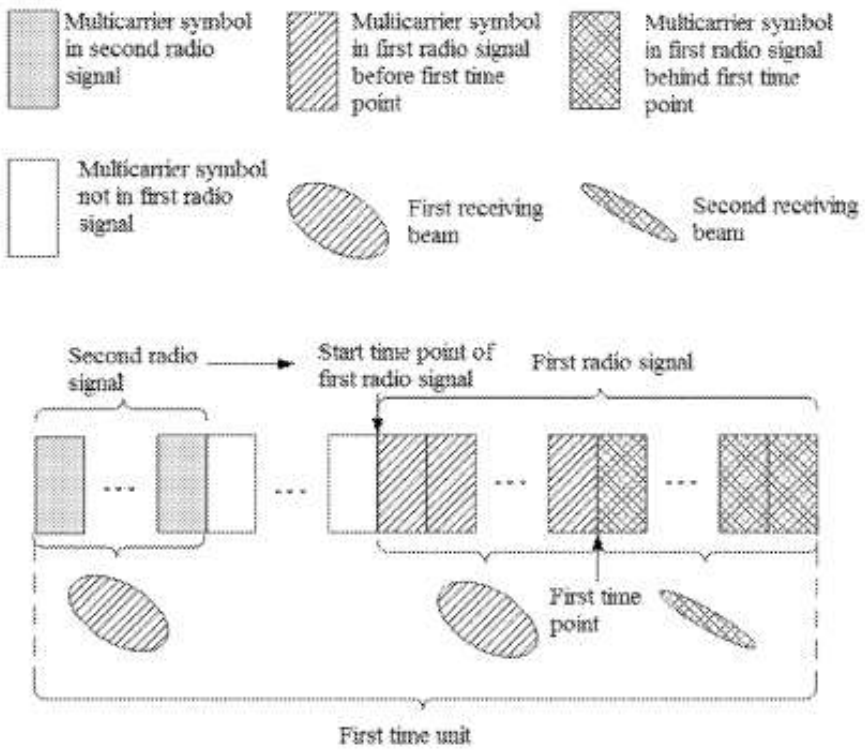

FIG. 7

Figure 7 "is a diagram illustrating a second radio signal and a first radio signal according to one embodiment of the" '081 patent. *Id.* at 9:35–37. As illustrated, "[g]rey rectangles represent multicarrier symbols in the second radio signal, rectangles filled by oblique lines represent multicarrier symbols in the first radio signal before the first time point, rectangles filled by cross lines represent multicarrier symbols in the first radio signal behind the first time point, blank rectangles represent multicarrier symbols not in the first radio signal, a wide oval filled by oblique lines represents a first receiving beam, and a narrow oval filled by cross lines represents a second receiving beam." *Id.* at 17:58–67.

As illustrated, "both the first radio signal and the second radio signal are transmitted within the first time unit, [and] the multicarrier symbols

occupied by the second radio signal are before the multicarrier symbols occupied by the first radio signal in [the] time domain." *Id.* at 18:1–5. Also as illustrated, "the first receiving beam is used for receiving the second radio signal and the multicarrier symbols of the first radio signal before the first time point, and the second receiving beam is used for receiving the multicarrier symbols of the first radio signal behind the first time point." *Id.* at 18:13–18.

The '081 patent explains that "the second radio signal indicates the start time point of the first radio signal in the first time unit, and the start time point is used for determining the time domain resource occupied by the first radio signal in the first time unit." *Id.* at 18:6–10. The '081 patent explains that "[t]he first time point is one time point within the first time unit behind the multicarrier symbols occupied by the second radio signal." *Id.* at 18:10–12.

In addition, the '081 patent discloses that for a subembodiment that "the second radio signal is a PDCCH, and the first radio signal is a PDSCH." *Id.* at 18:19–20. The '081 patent also discloses that for a subembodiment "the second radio signal is a DCI that is used for indicating downlink assignment, and the first radio signal is a PDSCH transmitted on the downlink resource indicated by the second radio signal." *Id.* at 18:21–24.

D. Illustrative Claim

Of the challenged claims, claims 1, 5, 9, and 11 are independent. Claim 1 is illustrative of the challenged claims and is reproduced below.

> 1. A method in a User Equipment (UE) for wireless communication, comprising:
>
> receiving a second radio signal;
>
> receiving a first radio signal;

> wherein the first radio signal is transmitted within a first time unit, a first bit block is used for generating the first radio signal, and the first radio signal comprises G multicarrier symbols; the second radio signal is transmitted within the first time unit, and the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols; as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain; when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol; and when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal; the first time point is one time point within the first time unit; and G is a positive integer.

Ex. 1001, 21:5–31.

E. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims of the ’081 patent are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §[1]	Reference(s)
1–12	102	Lee[2]
1–12	103	Chen,[3] Lee

[1] The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Because the earliest possible effective filing date of the ’081 patent is after March 16, 2013, we apply the AIA version of these bases for unpatentability.
[2] WO 2017/083489 A1, published May 18, 2017 (Ex. 1004, “Lee”).
[3] WO 2018/201861 A1, published Nov. 8, 2018 (Ex. 1012, “Chen”).

Pet. 13–83. Petitioner submits in support of its arguments the Declaration of Apostolos K. Kakaes, Ph.D. (Ex. 1002).

II. DISCRETIONARY DENIAL UNDER 35 U.S.C. § 314

Patent Owner argues that we should exercise discretion under § 314(a) to deny institution in light of the related district court litigation. Prelim. Resp. 40–47.

We consider the following factors when determining whether to deny institution under § 314(a) based on a parallel district court proceeding:

> 1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
>
> 2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
>
> 3. investment in the parallel proceeding by the court and the parties;
>
> 4. overlap between issues raised in the petition and in the parallel proceeding;
>
> 5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
>
> 6. other circumstances that impact the Board's exercise of discretion, including the merits.

Apple Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11 at 5–6 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*"). We also consider "several clarifications" made by the Director of the United States Patent and Trademark Office ("USPTO"). *See* USPTO Memorandum, Interim Procedure for

Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation, 2 (June 21, 2022) ("Director's Memo").[4]

The Director's Memo provides that "[c]onsistent with *Sotera Wireless, Inc.*,[5] the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB." Director's Memo 3. With our authorization, Petitioner has filed a stipulation, which stipulates "that, if the PTAB institutes *inter partes* review, Petitioner 'will not pursue in [*Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd. et al.*, Case No. 2:22-cv-00188-JRG (E.D. Tex.) (consolidated with *Apex Beam Technologies LLC v. ZTE Corporation*, Case No. 2:22-cv-00031-JRG-RSP (E.D. Tex.))] the specific grounds [asserted in IPR2023-00599], or . . . any other ground . . . that was raised or could have been reasonably raised in an IPR (i.e., any ground that could be raised under §§ 102 or 103 on the basis of prior art patent or printed publications).'" Ex. 1022, 1 (quoting *Sotera Wireless, Inc.*, Paper 12 at 13–14) (alterations in original).

We determine that the language of this stipulation sufficiently comports with the language of the stipulation discussed in the Director's Memo. *See* Director's Memo 3. We accordingly decline to discretionarily deny institution in view of the related district court litigation.

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[4] *Available at* https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

[5] *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (PTAB Dec. 1, 2020) (precedential).

III. PETITIONER'S EXPERT DECLARATION

Relying on the Board's precedential *Xerox* decision, Patent Owner argues that we should not consider Dr. Kakaes's declaration because it "is almost entirely a recitation of the Petition." Prelim. Resp. 47–48 (citing *Xerox Corp. v. Bytemar, Inc.*, IPR2022-00624, Paper 9 (PTAB Aug. 24, 2022) (precedential); 37 C.F.R. § 42.65(a)). Patent Owner argues that "[b]ecause Dr. Kakaes barely provides any independent analysis aside from copying the attorney arguments in the Petition and does not disclose the underlying facts or data upon which his opinions are based, his opinion should be entitled to no weight." *Id.*

We do not read *Xerox* to require us to give little weight to an expert declaration solely because some or all of it is also repeated within the Petition. Rather, *Xerox* found a declaration was entitled to little weight where the declaration merely repeated "the *conclusory* assertion for which it is offered to support." *Xerox*, Paper 9 at 15 (emphasis added). If declaration testimony is supported sufficiently and, in turn, supports contentions in the Petition, we do not give it little to no weight simply because it is repeated in the Petition. Patent Owner does not point to any specific statements in Dr. Kakaes's declaration and explain specifically why Patent Owner believes they are conclusory, and thus, Patent Owner has not sufficiently explained the applicability of *Xerox* here. *See, e.g.*, Prelim. Resp. 13 n.1, 18 n.2, 21 n.3, 23 n.4, 25 n.5, 28 n.6, 29 n.7, 47–48.

Moreover, we can assess the weight to be given to Dr. Kakaes's declaration testimony, including based on its corresponding factual support, if any, and afford such testimony an appropriate weight. Accordingly, at this

stage, we decline Patent Owner's invitation to assign no weight to all of Dr. Kakaes's declaration testimony.

IV. LEVEL OF ORDINARY SKILL IN THE ART

To determine whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). In assessing the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962–63 (Fed. Cir. 1986)). "[O]ne or more factors may predominate." *Id.*

Petitioner argues that one of ordinary skill in the art at the time of the invention of the '081 patent "would have had at least a master's degree in electrical engineering or a similar field and at least two years of experience working with telecommunications systems, including multiple-input multiple-output (MIMO) technology." Pet. 13 (quoting Ex. 1002 ¶ 75). Petitioner adds that "[a]dditional relevant work experience can compensate for less education, and *vice versa*." *Id.*

Patent Owner at this stage of the proceeding does not provide an alternative definition for a level of skill in the art that one would have had at the time of the invention of the '081 patent or identify any shortcoming in Petitioner's formulation. *See* Prelim. Resp. 10.

For purposes of this Decision on Institution, we adopt Petitioner's definition of the level of skill for one of ordinary skill in the art, except we

decline to adopt the recitals of "at least" as that language is vague and open-ended. Pet. 13. We also decline to adopt Petitioner's assertion concerning "[a]dditional relevant work experience," as it also is vague and open-ended. As adopted, we view the definition for the level of ordinary skill is consistent with the '081 patent and the asserted prior art, and we apply it in our analysis below.

V. CLAIM CONSTRUCTION

Because the Petition was filed after November 13, 2018, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b); 83 Fed. Reg. 51,340, 51,340–41, 51,343 (Oct. 11, 2018). In applying such standard, claim terms are generally given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

Petitioner argues that "no terms need construction to resolve the controversy in this forum." Pet. 11. Patent Owner argues that at this stage of the proceeding, "claim construction is not required to resolve any issues." Prelim. Resp. 10.

We determine that no express constructions are needed for us to render our Decision on Institution. *See, e.g.*, *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc*., 200 F.3d 795, 803 (Fed. Cir. 1999)) ("[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy.'"). Rather, at this stage of the proceeding, we apply the plain and ordinary meaning of the claim terms.

VI. PRINCIPLES OF LAW

A claim is unpatentable under 35 U.S.C. § 102 "if each and every [claim] limitation is found either expressly or inherently in a single prior art reference." *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 851 F.3d 1270, 1273 (Fed. Cir. 2017). "A claim limitation is inherent in the prior art if it is necessarily present in the prior art, not merely probably or possibly present." *Akamai Techs., Inc. v. Cable & Wireless Internet Servs., Inc.*, 344 F.3d 1186, 1192 (Fed. Cir. 2003) (citing *Rosco, Inc. v. Mirror Lite, Co.*, 304 F.3d 1373, 1380 (Fed. Cir. 2002)).

A claim is unpatentable under 35 U.S.C. § 103 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 of the invention to a person having ordinary skill in the art. *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 ordinary skill in the art; and (4) objective evidence

of non-obviousness, if present.[6] *See Graham*, 383 U.S. at 17–18. When evaluating a claim for obviousness, we also must "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

VII. ALLEGED ANTICIPATION BY LEE

Petitioner argues that Lee anticipates claims 1–12. Pet. 13–83. We have reviewed the parties' arguments and the evidence of record. For the reasons that follow, we determine that Petitioner demonstrates a reasonable likelihood that it would prevail in showing that Lee anticipates at least one of these claims.

A. Summary of Lee

Lee discloses "[a] wireless transmit/receive unit (WTRU) configured to perform wireless communications in higher frequency bands (e.g., above 6 GHz) using a fallback." Ex. 1004, code (57). Lee's "WTRU includes a receiver configured to receive, in a time transmission interval (TTI), at least one control signal and a first data signal using a first beam associated with a first beam identifier (ID) and a second data signal, subsequent to the first data signal, using a second beam associated with a second beam ID different from the first beam ID, such that one of the at least one control signal indicates the second beam ID." *Id.* In addition, Lee discloses "a processor configured to switch a receive beam of the receiver from the first beam to the second beam based on the second beam ID to receive the second data signal." *Id.*

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[6] Patent Owner does not present arguments or evidence of such objective evidence of non-obviousness. *See generally* Prelim. Resp.

B. Challenged Claim 1

1. Method for Wireless Communication (Preamble)

Claim 1's preamble recites "[a] method in a User Equipment (UE) for wireless communication." Ex. 1001, 21:5–6. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses claim 1's preamble. Pet. 13–15.

More specifically, we find that Lee discloses a wireless communication system 100 that includes "wireless transmit/receive units (WTRUs) 102a, 102b, 102c, 102d." Ex. 1004 ¶ 40, Fig. 1A. Lee discloses that the WTRUs "may be configured to transmit and/or receive wireless signals and may include user equipment (UE)." *Id.* ¶ 40. In addition, Lee discloses that wireless communications system 100 includes "a base station 114a and a base station 114b," which each "may be any type of device configured to wirelessly interface with at least one of the WTRUs." *Id.* ¶ 41.

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner at this stage of the proceeding, we are persuaded that Petitioner demonstrates, for purposes of this institution decision, that Lee discloses "[a] method in a User Equipment (UE) for wireless communication." In light of our finding, we need not, and thus do not, reach whether claim 1's preamble is limiting.

2. Receiving a Second Radio Signal

Claim 1 further recites "receiving a second radio signal." Ex. 1001, 21:7. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 15–16.

In particular, at this stage, we agree with Petitioner and find that Lee discloses that a WTRU (i.e., UE) receives control data (e.g., downlink (DL)

control information (DCI)) via a control channel. Ex. 1004 ¶¶ 167–168. We also agree with Petitioner and find that Lee interchangeability uses the terms (i) channel and signal, and (ii) control channel and PDCCH. *Id.* ¶ 86. And the ’081 patent states that the second radio signal can be “a PDCCH” or “a DCI carrying downlink assignment.” Ex. 1001, 3:59, 4:1–2.

In addition, at this stage, we agree with Petitioner and find that Lee’s Figure 12 illustrates the received control data (i.e., the second signal). Pet. 15–16. Figure 12, as annotated by Petitioner, is shown below.

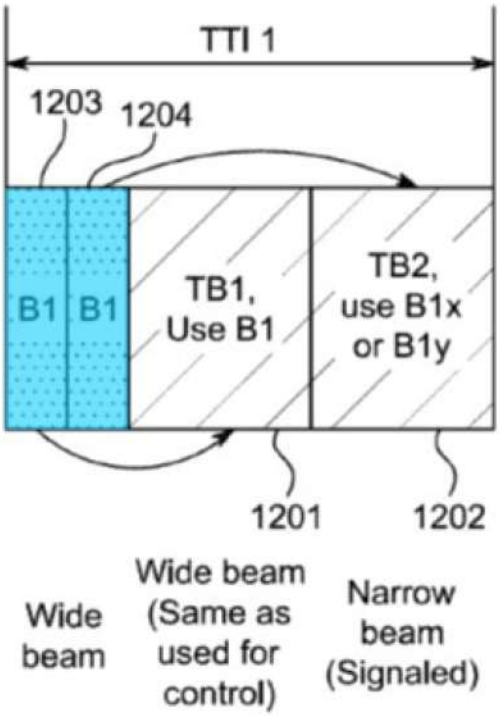

Figure 12 “shows a diagram for a dual transport block (TB) transmission scheme according to one or more [of Lee’s] embodiments.” Ex. 1004 ¶ 26. Petitioner annotates the figure by coloring in blue “control data B1” blocks 1203 and 1204, which together correspond to the second signal. *See* Pet. 15–16 (annotating Ex. 1004, Fig. 12); Ex. 1004 ¶¶ 168–169, Fig. 12.

At this stage, we find unavailing Patent Owner’s arguments that Lee “fails to disclose ‘receiving a second radio signal’ because B1 1203 and B1

1204 are two separate control signals and cannot collectively be the claimed 'second radio signal.'" Prelim. Resp. 13–18. In particular, at this stage, we disagree with Patent Owner that these two control data signals together cannot disclose the claimed second radio signal. Rather, at this stage, we conclude that the '081 patent uses the term "signal" broadly, including when describing signals (e.g., comprising symbols) at the physical layer. *See, e.g.*, Ex. 1001, 12:1–4 (disclosing that "layer 1 (Ll) 301 is the lowest layer and performs signal processing functions of each PHY layer"), Fig. 3 (showing the layers for the control and user planes). And, at this stage, we conclude that the claimed second signal being a "radio" signal connotes the physical layer. In fact, the '081 patent discloses that "the second radio signal . . . is generated by the PHY 301" for some embodiments. *Id.* at 12:49–50. Thus, we find that the claimed second radio signal covers signals having multiple portions (e.g., symbols).

This conclusion is consistent with Figure 7 of the '081 patent which illustrates that the second radio signal can comprise a stream of multicarrier symbols. *See id.* at Fig. 7 (showing for the second radio signal a stream of multicarrier symbols); *see also id.* at 17:58–60 ("Grey rectangles represent multicarrier symbols in the second radio signal" in Figure 7.).

We find unavailing Patent Owner's argument that Figure 7 shows that "the second signal only has one multi-carrier symbol," in contrast to the first radio signal which "can comprise different multi-carrier symbols." Prelim. Resp. 16–17 (citing Ex. 1001, Fig. 7). On this record, we find that this argument is incorrect. *See* Ex. 1004, 17:57–67 (describing Figure 7), Fig. 7. Notably, Patent Owner does not address why a *stream* of symbols would be sent for the second radio signal, if the symbol remains the same. Prelim.

Resp. 16–17. Moreover, the fill lines for the symbol rectangles for the first radio signal change between the two illustrated patterns to denote whether the symbols are before or behind the first time point, rather than to denote that "the first radio signal . . . can comprise different multi-carrier symbols," as Patent Owner argues. *Compare* Ex. 1001, 17:57–67 *and* Fig. 7, *with* Prelim. Resp. 16–17. Notably, Patent Owner does not address how to communicate effectively with only two different symbols if that is what the two different patterns actually represented. Prelim. Resp. 16–17.

And at this stage, we view Lee's disclosure of consecutive control signals B1 1203 and B1 1204 as being consistent with a stream of symbols for a radio signal, especially when considering the control signals at that layer. *Compare* Ex. 1004, Fig. 12, *with* Ex. 1001, Fig. 7; *see generally* Ex. 1001, 11:59–12:41, Fig. 3 (describing radio and control plane layers), 14:34–38. Hence, we agree with Petitioner that "[t]he '081 patent does not preclude the 'second radio signal' from having multiple portions." Pet. 16; Ex. 1002 ¶ 83.

In sum, at this stage, we find that Lee discloses "receiving a second radio signal." To the extent that a dispute remains concerning the scope of "second radio signal," the parties during trial should fully develop the record for claim construction purposes, in accordance with our Rules.

3. Receiving a First Radio Signal

Claim 1 further recites "receiving a first radio signal." Ex. 1001, 21:8. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 16–19.

In particular, at this stage, we agree with Petitioner and find that Lee discloses that the WTRU receives two transport blocks TB1 and TB2 (i.e.,

the first signal) that carry data. Ex. 1004 ¶¶ 110, 167–168. We also agree with Petitioner and find that Lee interchangeability uses the terms data, data signal, data channel, data channel beam, and PDSCH. *Id.* ¶ 86. And the ’081 patent states that the first radio signal can be “a PDSCH.” *E.g.*, Ex. 1001, 8:19–20.

In addition, at this stage, we agree with Petitioner and find that Lee’s Figure 12 illustrates the received transport blocks (i.e., the first signal). Pet. 17. Figure 12, as annotated by Petitioner, is shown below.

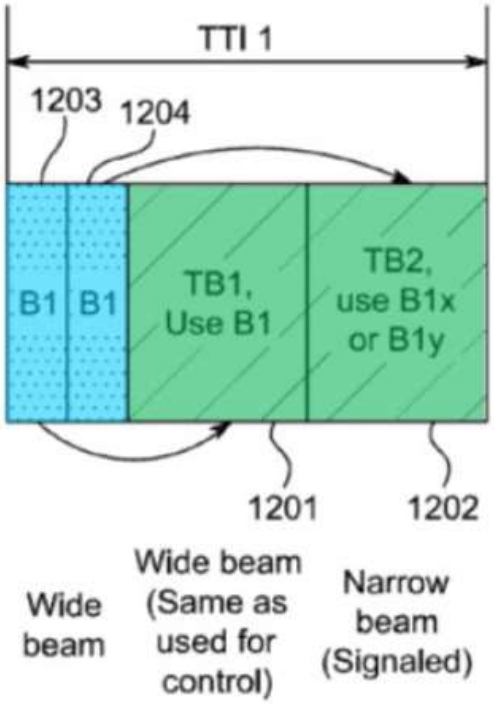

Figure 12 “shows a diagram for a dual transport block (TB) transmission scheme according to one or more [of Lee’s] embodiments.” Ex. 1004 ¶ 26. Petitioner annotates the figure by, *inter alia*, coloring in green transport blocks TB1 1201 and TB2 1202, which together correspond to the first signal. *See* Pet. 17 (annotating Ex. 1004, Fig. 12); Ex. 1004 ¶¶ 167–169, Fig. 12.

At this stage, we find unavailing Patent Owner's arguments that Lee's TB1 and TB2 are separate signals, and thus, Lee does not disclose that TB1 and TB2 comprise one radio signal. Prelim. Resp. 18–20. For the same reasons we discuss above concerning the second radio signal, at this stage we conclude that the '081 patent uses the term "signal" broadly, including when describing a "radio" signal, which comprises "G multicarrier symbols." *See supra* Section VII.B.2; Ex. 1001, 21:11–12, 21:31.

And at this stage, we view Lee's disclosure of consecutive transport blocks TB1 and TB2 as being consistent with a stream of symbols at the physical layer for a radio signal. *Compare* Ex. 1004, Fig. 12, *with* Ex. 1001, Fig. 7. Hence, we agree with Petitioner that the '081 patent does not preclude the first radio signal from having multiple portions. Pet. 18.

In sum, at this stage, we find that Lee discloses "receiving a first radio signal." To the extent that a dispute remains concerning the scope of "first radio signal," the parties during trial should fully develop the record for claim construction purposes, in accordance with our Rules.

4. Transmitted Within a First Time Unit

Claim 1 further recites "wherein the first radio signal is transmitted within a first time unit." Ex. 1001, 21:9–10. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 19–20.

In particular, at this stage, we agree with Petitioner and find that Lee discloses that transport blocks TB1 1201 and TB2 1202 (i.e., first radio signal) are transmitted within a single transmission time interval (TTI) (i.e., first time unit). Ex. 1004 ¶¶ 6, 167; Ex. 1002 ¶ 88. Moreover, Lee's Figure 12, as shown above, illustrates that transport blocks 1201 and 1202 are

"transmitted (multiplexed) in a TDM fashion within a single TTI (e.g., TTI1)." Ex. 1004 ¶ 167, Fig. 12 (showing that TB1 and TB2 are within TTI1).

At this stage, we find unavailing Patent Owner's arguments that Lee fails to disclose this limitation. Prelim. Resp. 20–22. These arguments are premised on Lee failing to disclose the claimed first and second radio signals. *Id.* As we find above, however, at this stage, we find that Lee discloses the claimed first and second radio signals. *See supra* Sections VII.B.2–3. Thus, Patent Owner's arguments regarding this limitation are unavailing.

In sum, at this stage, we find that Lee discloses "wherein the first radio signal is transmitted within a first time unit."

5. First Bit Block

Claim 1 further recites "a first bit block is used for generating the first radio signal." Ex. 1001, 21:10–11. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 20–21.

In particular, at this stage, we agree with Petitioner and find that Lee discloses that a Medium Access Control (MAC) Protocol Data Unit (PDU) (i.e., first bit block) is used to generate transport blocks TB1 and TB2 (i.e., first radio signal). Ex. 1004 ¶¶ 110, 224–230, Figs. 13–14; Ex. 1002 ¶¶ 90–92. To that end, Lee discloses that "[a] physical downlink data channel may carry payload information in the form of" a MAC PDU from the MAC layer. Ex. 1004 ¶ 110. And at this stage, we find persuasive Dr. Kakaes's testimony that it was well known that a MAC PDU is a bit block. Ex. 1002 ¶ 91 (citing Ex. 1008, 49); *see also* Ex. 1008, 49 ("A MAC PDU is a bit string that is byte aligned (i.e. multiple of 8 bits) in length.").

In addition, at this stage, we agree with Petitioner and find that Lee's Figure 13 illustrates that a MAC PDU is used for generating the first signal (i.e., TB1 and TB2). Pet. 20–21. Figure 13, as annotated by Petitioner, is shown below.

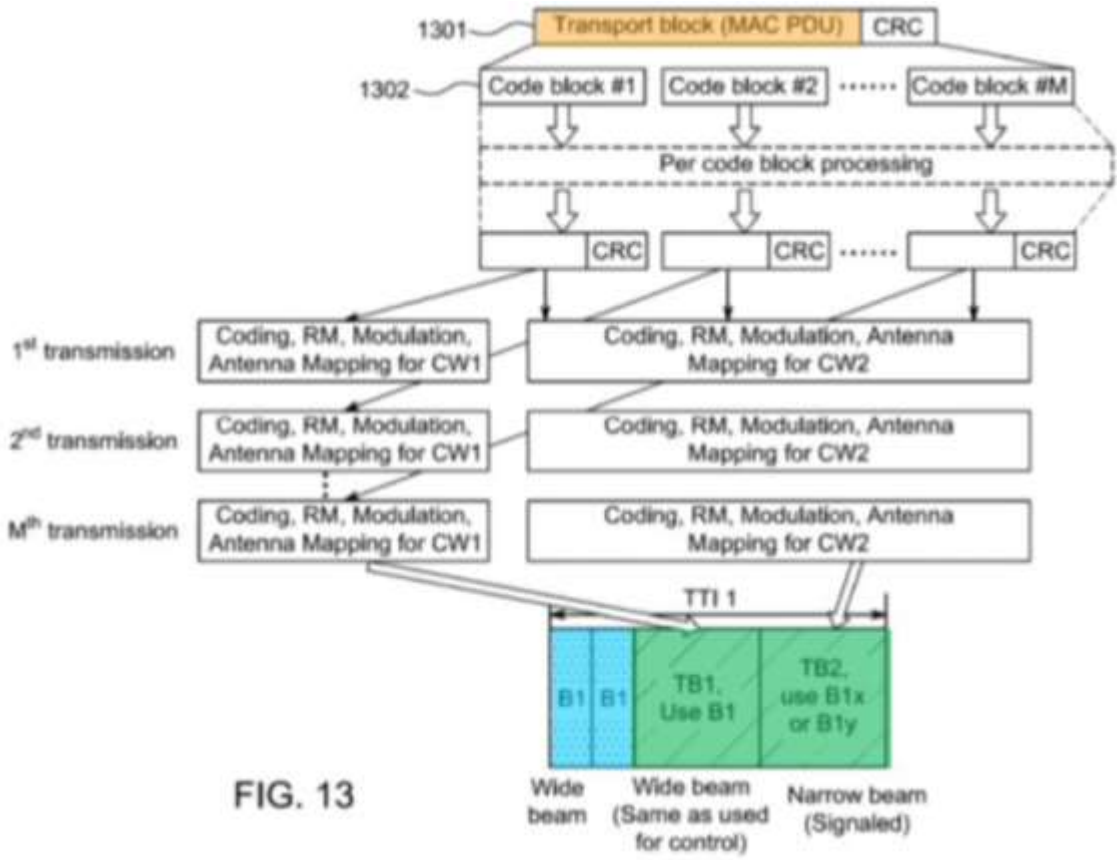

FIG. 13

Figure 13 "shows a diagram illustrating a use of a dual TB transmission scheme for data fallback according to one or more embodiments." Ex. 1004 ¶ 27. Petitioner annotates the figure by coloring (i) in orange Transport Block (MAC PDU) 1301, (ii) in blue control data B1 blocks, and (iii) in green transport blocks TB1 and TB2. *See* Pet. 21 (annotating Ex. 1004, Fig. 13). As illustrated, MAC PDU 1301 comprises M code blocks. Ex. 1004 ¶ 224, Fig. 13. Lee discloses that the code blocks may be used to transmit codewords—"a codeword represents user data before it is formatted for transmission." *Id.* ¶¶ 169, 224. Moreover, as illustrated, Lee discloses

that "a wide data Tx beam B1 may be used for transmitting TBl (i.e., first codeword) of a transmission and a narrow data Tx beam B1x or B1y may be used for transmitting TB2 (i.e., second codeword)." *Id.* ¶ 224.

At this stage, we find unavailing Patent Owner's argument that "Petitioner's annotated Fig. 13 itself shows how Lee's transport block (MAC PDU) generates two different signals (i.e., TB1 and TB2) from two different code blocks and two different code words (CW)." Prelim. Resp. 23; *see also id.* at 24 (making same argument). Again, as we discuss above, at this stage, we find that Lee's disclosure of TB1 and TB2 discloses the first radio signal. *See supra* Section VII.B.3. Moreover, at this stage, we find that a single MAC PDU is used for both TB1 and TB2. Ex. 1004 ¶¶ 169, 224, Fig. 13.

In sum, we find that Lee discloses "a first bit block is used for generating the first radio signal."

6. G Multicarrier Symbols

Claim 1 further recites that "the first radio signal comprises G multicarrier symbols," where "G is a positive integer." Ex. 1001, 21:11–12, 21:31. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses these limitations. Pet. 22–23, 33.

In particular, at this stage, we find that Lee's transport blocks TB1 and TB2 (i.e., first radio signal) comprise a number (i.e., G) of orthogonal frequency-division multiplexing (OFDM) symbols (i.e., multicarrier symbols). *See* Ex. 1004 ¶¶ 91, 95, Fig. 2; Ex. 1002 ¶¶ 93–96. At this stage, we also find that Lee's TTI includes a positive integer number of OFDM symbols, and that it was known in the art that OFDM symbols are designed such that a TTI includes an integer number of OFDM symbols. Ex. 1002 ¶ 95; Ex. 1006, 18.

In addition, Lee further discloses that a "'data region' may be part of the scheduling interval in time domain, which may be referred to in *units* of OFDM symbols, used for the transmission of all data channel beams in that scheduling interval." Ex. 1004 ¶ 79 (emphasis added). At this stage, we view "units" here as disclosing that there are a positive integer number of OFDM symbols in each TTI. *Id.*

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner at this stage of the proceeding, we are persuaded that Petitioner demonstrates, for purposes of this institution decision, that Lee discloses that "the first radio signal comprises G multicarrier symbols," where "G is a positive integer."

7. Second Radio Signal Within First Time Unit

Claim 1 further recites that "the second radio signal is transmitted within the first time unit." Ex. 1001, 21:12–13. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 24.

In particular, at this stage, we find that Lee discloses that its control data B1 blocks 1203 and 1204 (i.e., second radio signal) are transmitted within the same first time unit (i.e., TTI1) as transport blocks TB1 and TB2. Ex. 1004 ¶¶ 167–169, Fig. 12; Ex. 1002 ¶ 97.

At this stage, we find unavailing Patent Owner's arguments that Lee fails to disclose this limitation. Prelim. Resp. 20–22. These arguments are premised on Lee failing to disclose the claimed first and second radio signals. *Id.* As we find above, however, at this stage, we find that Lee discloses the claimed first and second radio signals. *See supra* Sections

VII.B.2–3. Thus, Patent Owner's arguments regarding this limitation are unavailing.

In sum, at this stage, we find that Lee discloses that "the second radio signal is transmitted within the first time unit."

8. Second Radio Signal Determining a Time-Domain Resource

Claim 1 further recites that "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols." Ex. 1001, 21:13–15. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 24–26.

In particular, at this stage, we find that Lee discloses that control data B1 blocks (i.e., the second radio signal) are used for determining a time-domain resource occupied by transport blocks TB1 and TB2 (the first radio signal), which comprise G multicarrier symbols. *See supra* Sections VII.B.2, 4, 6; Ex. 1002 ¶¶ 98–100. For example, Lee discloses that "[a] physical downlink control channel may carry data related control information to identify, demodulate and decode the associated data channel properly." Ex. 1004 ¶ 109. Lee adds that "[t]he resource allocation of th[e physical downlink data] channel may be carried in the scheduling information in the physical downlink control channel." *Id.* ¶ 110. And at this stage, we find persuasive the testimony of Dr. Kakaes that one of ordinary skill in the art "would have understood that *Lee*'s scheduling information and time/frequency information included in the control channel would have included the time-domain resource allocation for the multicarrier symbols in the data channel (e.g., transport blocks TB1 and TB2)," and we find this testimony is consistent with Lee's disclosure. *See* Ex. 1002 ¶ 100; Ex. 1004 ¶¶ 109–110, Fig. 12.

At this stage, we find unavailing Patent Owner's argument that Lee's disclosure of "scheduling information in the physical downlink control channel" provides no indication of "determining a time-domain resource occupied by the G multicarrier symbols" of the first data signal. Prelim. Resp. 26 (citing Ex. 1004 ¶ 110). Lee explicitly discloses that this scheduling information relates to the resource allocation for the physical downlink data channel, which as we find above carries the first radio signal which comprises G multicarrier symbols. *See* Ex. 1004 ¶¶ 109–110; *supra* Section VII.B.6.

At this stage, we also find unavailing Patent Owner's argument that "Lee does not use a single signal to determine a time-domain resource for another single signal," as this argument relates to Patent Owner's arguments concerning Lee's disclosure of two control blocks and two transport blocks for the claimed second and first radio signals, respectively. *Id.* Thus, Patent Owner's arguments regarding this limitation are unavailing for the reasons we provide above. *See supra* Sections VII.B.2–3 (finding that Lee discloses the first and second radio signals).

In sum, at this stage, we find that Lee discloses that "the second radio signal is used for determining a time-domain resource occupied by the G multicarrier symbols."

9. As for Any One Given Multicarrier Symbol

Claim 1 further recites that "as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain." Ex. 1001, 21:15–21. At this stage of the

proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 26–29.

In particular, at this stage, we find that Lee discloses that its WTRU (UE) "may employ MIMO technology." Ex. 1004 ¶ 55. For example, Lee discloses that "the WTRU 102 may include two or more transmit/receive elements 122 (e.g., multiple antennas) for transmitting and receiving wireless signals over the air interface 116." *Id.*; *see also id.* at Fig. 4, ¶ 121 (illustrating and describing an embodiment employing a multi-antenna system); Ex. 1002 ¶ 101.

In addition, Lee discloses switching beams during a data transmission period. In particular, Lee discloses switching beams at a time (i.e., a first time point), which is between transport blocks TB1 and TB2 within a time transmission interval (TTI) (i.e., a first time unit). Ex. 1004 ¶¶ 11, 171, 258–259, 261–262, Figs. 19–20; Ex. 1002 ¶ 102; *see also* Ex. 1002 ¶ 72 ("A 'beam' may be one lobe (e.g. main/side/grating) of a transmit radiation pattern and receive gain pattern of an antenna array.").

In addition, at this stage, we agree with Petitioner and find that Lee's Figure 12 illustrates this beam switching. Pet. 27–28. Figure 12, as annotated by Petitioner, is shown below.

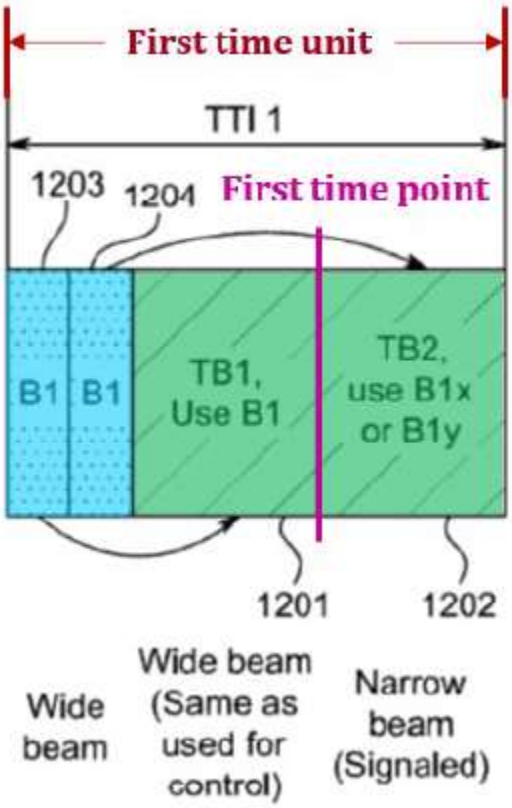

Figure 12 "shows a diagram for a dual transport block (TB) transmission scheme according to one or more [of Lee's] embodiments." Ex. 1004 ¶ 26. Petitioner annotates the figure by, *inter alia*, coloring in green transport blocks TB1 1201 and TB2 1202, labeling in red the TTI 1 interval as "First time unit," and extending and coloring purple the line between and separating blocks TB1 1201 and TB2 1202. *See* Pet. 28 (annotating Ex. 1004, Fig. 12). As illustrated, "two transport blocks 1201 and 1202 [are] transmitted (multiplexed) in a TDM fashion within a single TTI (e.g., TTI1)," and "[t]he transmission of the individual transport blocks may use the same beam as the control channel (e.g., transport block 1201 which uses a wide beam), or may use a different beam (e.g., transport block 1202 which uses a narrow beam)." Ex. 1004 ¶ 167, Fig. 12. And as also illustrated, Lee discloses switching from the wide beam to the narrow beam at the first time

point (i.e., at the start of block TB2 1202). *Id.*; *see also id.* ¶ 259 (disclosing "switching a receive beam of the WTRU from the first beam to the second beam, to receive the second transport block, based on beam information associated with the second beam received in one of the at least one control signal").

In addition, as discussed above, Lee's transport blocks TB1 and TB2 comprise G multicarrier symbols. *See supra* Section VII.B.6. Thus, Lee discloses for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving (i.e., the receiving beam) for the given multicarrier symbol is related to the relative position of a time domain resource occupied by the given multicarrier symbol with respect to the first time point in the time domain. Ex. 1004 ¶¶ 167, 259, Fig. 12; Ex. 1002 ¶ 104. In other words, when the given multicarrier symbol is before the first time point (e.g., in TB1), the wide beam is used for receiving the given multicarrier symbol, and when the given multicarrier symbol is behind the first time point (e.g., in TB2), the narrow beam is used for receiving the given multicarrier symbol. Ex. 1004 ¶¶ 167, 259, Fig. 12.

At this stage, we find unavailing Patent Owner's argument that "Petitioner and Lee are generally silent about using this time point as a metric related to the time domain resource occupied by ***any given multicarrier symbol*** out of the G multicarrier symbols because Lee discloses little more than describing that signals may be comprised of multicarrier symbols." Prelim. Resp. 28–29 (citing Pet. 45–47, 53). Likewise, we find unavailing Patent Owner's argument that "Petitioner does not and cannot make the leap required to show that Lee discloses a relational nature of any given multicarrier symbol to the relative position of the time-domain

resource occupied by the said multicarrier symbol with respect to first time point." *Id.* at 29. As we discuss above, Lee discloses that what beam is used for receiving each of the symbols is related to the relative position of a time-domain resource occupied by the given multicarrier symbol (e.g., whether a symbol occupies a slot that is before or behind) a first time point. Ex. 1004 ¶¶ 167, 259, Fig. 12; Ex. 1002 ¶ 104. Thus, at this stage, we find Patent Owner's arguments to be contrary to Lee's disclosure.

Moreover, Patent Owner's argument concerning using the first time point "as a metric" is unclear, and incorrect to the extent that it seeks to add an additional requirement to the claim language. *See In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998) (stating "the name of the game is the claim"); *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (stating limitations not appearing in the claims cannot be relied upon for patentability).

In sum, at this stage, we find that Lee discloses that "as for any one given multicarrier symbol of the G multicarrier symbols, the multi-antenna related receiving for the given multicarrier symbol is related to the relative position of a time-domain resource occupied by the given multicarrier symbol with respect to a first time point in time domain."

10. When Behind the First Time Point

Claim 1 further recites that "when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the second radio signal is used for determining the multi-antenna related receiving for the given multicarrier symbol." Ex. 1001, 21:21–25. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 29–30.

In particular, at this stage, and as we discuss above, we find that Lee discloses that when the time-domain resource occupied by the given multicarrier symbol is behind the first time point, the beam is switched to a narrow beam to receive transport block TB2. *See supra* Section VII.B.9; Ex. 1004 ¶¶ 167–168, 259, Fig. 12. Moreover, Lee discloses that the control data B1 (i.e., second radio signal) is used for determining the receiving beam for the symbols in transport block TB2. *See* Ex. 1004 ¶ 167 (disclosing that "the narrow beam ID may need to be signaled in the control region of the TTI" when transport block 1202 uses the different beam (i.e., the narrow beam)); *see also id.* ¶¶ 6–8 (disclosing that control signal(s) indicate a second beam ID associated with a second beam to be switched to for receiving additional data), 150 (disclosing that "[t]he DCI in the control channel may carry a beam ID or a beam index for the data channel"), Fig. 19.

In sum, at this stage, we find that Lee discloses this limitation.

11. When Before the First Time Point

Claim 1 further recites that "when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the multi-antenna related receiving for the given multicarrier symbol is related to the multi-antenna related receiving for the second radio signal." Ex. 1001, 21:25–29. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 31–32.

In particular, at this stage, and as we discuss above, we find that Lee discloses that when the time-domain resource occupied by the given multicarrier symbol is before the first time point, the same beam (e.g., the wide beam in Figure 12) as used for the control channel is used for receiving

the symbols (e.g., transport block TB1). *See supra* Section VII.B.9; Ex. 1004 ¶¶ 167–168, 259, Figs. 12, 19.

In sum, at this stage, we find that Lee discloses this limitation.

12. First Time Point

Claim 1 further recites that "the first time point is one time point within the first time unit." Ex. 1001, 21:30–31. At this stage of the proceeding, we agree with Petitioner and find that Lee discloses this limitation. Pet. 32.

In particular, at this stage, and as we discuss above, we find that Lee discloses that the beams switch at one time point (i.e., the first time point), which is within the first time unit (i.e., TTI 1 for Figure 12). *See supra* Section VII.B.9 (discussing disclosure of first time point); Ex. 1004 ¶¶ 167–168, 259, Figs. 12, 19; Ex. 1002 ¶ 109.

In sum, at this stage, we find that Lee discloses this limitation.

13.Summary

In summary, based on the current record, and for purposes of this institution decision, we determine that Petitioner shows a reasonable likelihood that Lee anticipates claim 1.

C. Challenged Claims 2–12

At this stage in the proceeding, Patent Owner does not address separately Petitioner's arguments and evidence as to how Lee discloses the limitations of claims 2–12. *See* Prelim. Resp. 30–31. We have reviewed Petitioner's arguments and evidence regarding these claims, and, on the current record, we find them persuasive for purposes of institution.

VIII. ALLEGED OBVIOUSNESS OVER LEE AND CHEN

Petitioner argues that the combination of Lee and Chen renders claims 1–12 obvious. Pet. 50–83. Petitioner already has demonstrated a reasonable likelihood of success in proving that at least one claim of the ’081 patent is anticipated. In order to provide guidance to the parties, however, we address the issues in dispute for this ground. *See* Consolidated Trial Practice Guide (November 2019)[7] 6 (“If a trial is instituted, the Board generally will provide analysis of the strengths and weaknesses of all challenges in the petition in order to provide guidance to the parties for the upcoming trial.”).

A. Summary of Chen

Chen relates to the field of communications technology and in particular relates to message-decoding. Ex. 1012, 3. Chen teaches that a receiving end device (i) receives a second message associated with a first message from a transmitting end device; (ii) determines, based on the second message, a target receiver parameter for decoding the first message; and (iii) decodes the first message transmitted by the transmitting end device based on the target receiver parameter. *Id.* at code (57). Chen teaches that these steps “enable a receiving end device to determine a receiver parameter based on a second message associated with a first message and can also improve message transmission performance.” *Id.* In addition, Chen teaches that the first message can comprise a data signal and that the second message can comprise a control message. *Id.* at 12.

B. Patent Owner’s Arguments Concerning Chen

Patent Owner argues that Chen fails to teach multiple limitations of claim 1 because “Chen does not mention multicarrier symbols at all in its

[7] *Available at* https://www.uspto.gov/TrialPracticeGuideConsolidated.

specification." Prelim. Resp. 35; *see also id.* at 35–36 (arguing that Chen does not teach receiving multicarrier symbols). Petitioner, however, relies on the combined teachings of Lee and Chen, and in particular, Lee's teachings regarding multicarrier symbols for these limitations. *See* Pet. 56–57, 62. Similarly, Patent Owner argues that Chen fails to teach other limitations of claim 1, but acknowledges that Petitioner does not rely on Chen for those limitations. *See* Prelim. Resp. 31–33. Obviousness, however, cannot be overcome "by attacking references individually where the [ground] is based upon the teachings of a combination of references." *See Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1050 (Fed. Cir. 2019) (quoting *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986)). Accordingly, we find these arguments unavailing.

In addition, Patent Owner argues that "Chen is directed to different set of problems and solutions" than the '081 patent, which seeks to "avoid[] the problem of delay" between the second and first signal due to decoding. Prelim. Resp. 37–38 (citing Ex. 1001, 4:24–37). At this stage, we find inapposite Patent Owner's argument that the prior art and the '081 patent may have different purposes. *See In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009 (CCPA 1968) ("The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.")); *cf. Nat'l Steel Car, Ltd. v. Canadian Pac. Ry., Ltd.*, 357 F.3d 1319, 1339 (Fed. Cir. 2004) ("A finding that two inventions were designed to resolve different problems . . . is insufficient to demonstrate that one invention teaches away from another.").

IX. CONCLUSION

For the foregoing reasons, we determine that Petitioner shows a reasonable likelihood that it would prevail in proving the unpatentability of at least one of the challenged claims of the ’081 patent. We thus institute an *inter partes* review of all of the challenged claims of the ’081 patent on all grounds asserted in the Petition. *See* 37 C.F.R. § 42.108(a).

Any findings or conclusions in this Decision are made only for the purposes of institution and are not dispositive of any issue. We have not made a final determination with respect to the patentability of any challenged claim. Our final determination will be based on the record as fully developed during trial, including any evidence or argument timely presented by the parties under our Rules.

X. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of the ’081 patent is instituted on all of the challenged claims and all grounds asserted in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial commences on the entry date of this Decision.

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