

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AT&T MOBILITY LLC, AT&T SERVICES INC., ERICSSON INC.,
NOKIA OF AMERICA CORPORATION, and T-MOBILE USA, INC.,
Petitioner,

v.

DAINGEAN TECHNOLOGIES LTD.,
Patent Owner.

IPR2024-00310
Patent 10,932,207 B2

Before CHRISTOPHER L. OGDEN, JOHN R. KENNY, and
MARY C. HOFFMAN, *Administrative Patent Judges*.

HOFFMAN, *Administrative Patent Judge*.

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

I. INTRODUCTION

AT&T Mobility LLC, AT&T Services Inc., Ericsson Inc., Nokia of America Corporation, and T-Mobile USA, Inc. (collectively, “Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 4–6 and 8 of U.S. Patent No. 10,932,207 B2 (Ex. 1001, “the ’207 patent”). Daingean Technologies Ltd. (“Patent Owner”) filed a Preliminary Response (Paper 8, “Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314; 37 C.F.R. § 42.4(a). Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . and any response . . . 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.” Based on the current record and for the reasons explained below, Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one of the challenged claims of the ’207 patent. We institute this *inter partes* review.

A. REAL PARTIES IN INTEREST

Petitioner identifies AT&T Corp., AT&T Mobility LLC, AT&T Mobility II LLC, AT&T Services Inc., Ericsson Inc., Nokia of America Corporation, and T-Mobile USA, Inc. as the real parties in interest. Pet. 1. Patent Owner identifies itself, Daingean Technologies Ltd., as the real party in interest. Paper 4, 1.

B. RELATED PROCEEDINGS

The parties identify *Daingean Tech. Ltd. v. AT&T Inc. et al.*, 2:23-cv-00123-JRG (E.D. Tex.) and *Daingean Tech. Ltd. v. T-Mobile USA, Inc. et al.*,

No. 2:23-cv-00347 (E.D. Tex.). Pet. 1; Paper 4, 1. Patent Owner also identifies *inter partes* reviews IPR2024-00401 and IPR2024-00510. Paper 4, 1.

II. BACKGROUND

A. THE '207 PATENT (EX. 1001)

The '207 patent relates to “a terminal apparatus and a base station apparatus [that] can efficiently perform a random access procedure.” Ex. 1001, 2:37–39.

As seen in Figure 6 below, the patent describes a 4-step contention based random access procedure.

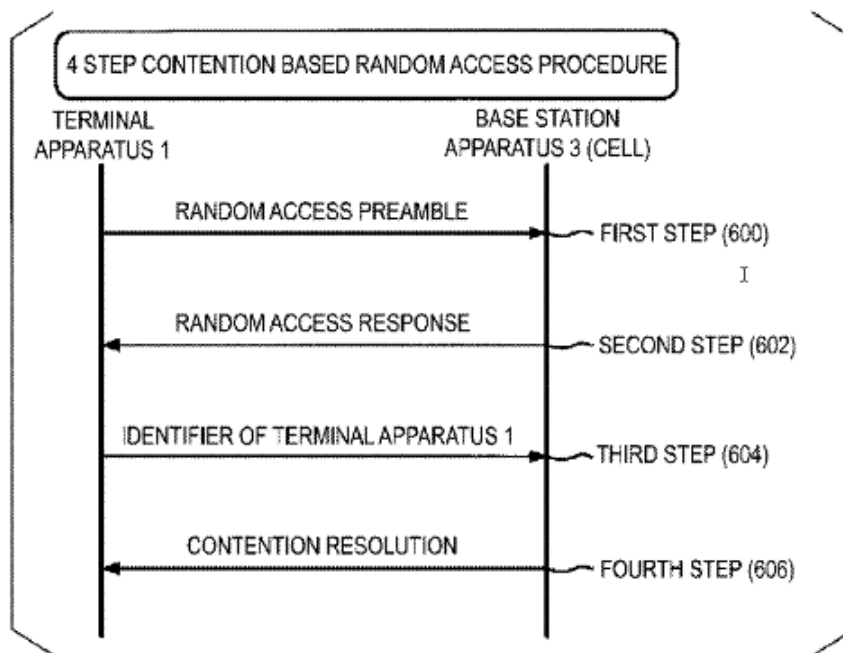


FIG. 6

Figure 6 above illustrates the four steps in a 4-step contention based random access procedure. In first step 600, terminal apparatus 1 transmits a random access preamble (random access message 1) to base station apparatus 3 using the Physical Random Access Channel (PRACH). Ex. 1001, 6:14–23, 47–

53, 12:29–35. In second step 602, the terminal apparatus receives a random access response from the base station. *Id.* at 12:36–37. In third step 604, the terminal apparatus transmits an identifier of the terminal apparatus. *Id.* at 12:52–53. In fourth step 606, the terminal apparatus receives contention resolution from the base station. *Id.* at 12:59–60.

The terminal apparatus may initiate the 4-step procedure when the measured Reference Signal Received Power (RSRP) does not exceed a certain threshold. Ex. 1001, 16:61–17:5. When the measured RSRP exceeds the threshold, the terminal apparatus may instead initiate a 2-step contention based random access procedure, illustrated below in Figure 7. *Id.*

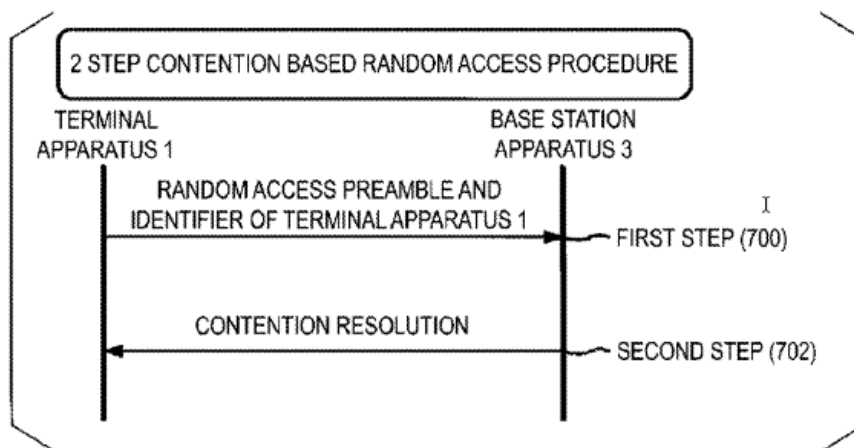


FIG. 7

Figure 7, above, illustrates a 2-step contention based random access procedure having two steps: first step 700 and second step 702. Ex. 1001, 13:17–21. In first step 700, terminal apparatus 1 transmits, to base station apparatus 3, a random access preamble *and* an identifier of the terminal apparatus. *Id.* at 13:22–23. In second step 702, the terminal apparatus receives contention resolution. *Id.* at 13:34–35.

In the first steps of the 4-step and 2-step procedures (step 600 and step 700), the terminal apparatus may, based on a failure of random access response reception or contention resolution, ramp up transmit power for the transmission of the PRACH including the random access preamble. Ex. 1001, 29:14–16; 30:24–34. Transmit power is given by “PREAMBLE_RECEIVED_TARGET_POWER,” which is given by the following equation:

$$\begin{aligned} \text{PREAMBLE_RECEIVED_TARGET_POWER} = \\ \text{preambleInitialReceivedTargetPower}(m) + \text{DELTA_PREAMBLE}(F) + \\ (\text{PREAMBLE_TRANSMISSION_COUNTER}-1) * \\ \text{powerRampingStep}(m) \end{aligned}$$

where “preambleInitialReceivedTargetPower(m)” and “powerRampingStep(m)” are “configured by higher layers (RRC [radio resource control]) for $m=0$ and $m=1$.” *Id.* at 29:16–47. For the 4-step procedure (as well as for a non contention based random access procedure) then $m=0$, and for the 2-step procedure then $m=1$. *Id.* at 29:40–47. For example, powerRampingStep(0) is a step size of transmit power ramp up for the 4-step procedure while powerRampingStep(1) is a step size for the 2-step procedure. *Id.* at 29:53–55. The base station may transmit RRC information for indicating preambleInitialReceivedTargetPower(0), preambleInitialReceivedTargetPower(1), powerRampingStep(0), and powerRampingStep(1). *Id.* at 29:62–30:2.

Common preambleInitialReceivedTargetPower and common powerRampingStep may be used regardless of the selected type/form of random access procedure (i.e., 2-step or the 4-step procedure). Ex. 1001, 30:3–12.

The base station may transmit RCC information for indicating DELTA_PREAMBLE(*F*). Ex. 1001, 30:13–21. Each DELTA_PREAMBLE(*F*) may correspond to a PRACH format (*F*). *Id.* at 30:14–15.

A common “PREAMBLE_TRANSMISSION_COUNTER” may be used regardless of the selected type/form of random access procedure. Ex. 1001, 27:60–63; 26:37–56. If the terminal apparatus determines that random access has failed, it may determine whether to increment the counter by one step. *Id.* at 28:39–43.

B. CHALLENGED CLAIMS

The Petition challenges claims 4–6 and 8 of the ’207 patent. Pet. 3. Independent claim 4 reads as follows:

4. [4pre]¹ A base station device comprising:
- [4a] control circuitry configured to control a 2-step contention based random-access procedure and a 4-step contention based random-access procedure; and
 - [4b] reception circuitry configured to receive a physical random access channel with a random access preamble in a first step of the 2-step contention based random-access procedure or in a first step of the 4-step contention based random-access procedure; wherein
 - [4c] transmission power for the physical random access channel is given based at least on a PREAMBLE_RECEIVED_TARGET_POWER;
 - [4d] for the 4-step contention based random access procedure, the PREAMBLE_RECEIVED_TARGET_POWER is given based at least on a preambleInitialReceivedTargetPower(0) and a powerRampingStep(0); and
 - [4e] for the 2-step contention based random access procedure, the PREAMBLE_RECEIVED_TARGET_POWER is given based

¹ For ease of reference, we include bracketed designations for the preamble recitation and limitations of claim 4.

at least on a preambleInitialReceivedTargetPower(1) and a powerRampingStep(1).

Ex. 1001, 36:43–62.

Claims 5 and 6 depend from claim 4. Ex. 1001, 36:63–37:9. Independent claim 8 is a method claim and recites subject matter similar to claim 4. *Id.* at 38:5–25.

C. ASSERTED GROUNDS OF UNPATENTABILITY

We summarize the grounds advanced in the Petition below:

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1A ²	4–6, 8	102(a)(1)–(2)	Lee1 ³
1B	4–6, 8	103	Lee1
2	4–6, 8	103	Lee1, Lee2 ⁴

Pet. 3.

In support of its arguments, Petitioner relies on a declaration of Dr. Mark Mahon. Ex. 1003. Patent Owner relies on a declaration of Dr. Karthikeyan Sundaresan. Ex. 2002.

III. ANALYSIS

A. LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art at the time of the invention is a factual determination that provides a “primary guarantee of objectivity” in an

² The Petition combines Grounds 1A and 1B into a single Ground 1.

³ Lee et al., US 2017/0019930 A1, published January 19, 2017. Ex. 1005 (“Lee1”).

⁴ Lee et al., US 2010/0255847 A1, published October 7, 2010. Ex. 1006 (“Lee2”).

obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Petitioner asserts that a person of ordinary skill in the art (“POSITA”), on or around the earliest possible priority date of the ’207 patent, would have had “a B.S. in Electrical Engineering or a related field with at least three years of experience designing, developing, and/or testing telecommunication systems” and “familiarity with the wireless standards and well-known protocols for accessing wireless networks,” and that “[m]ore education may supplement practical experience or *vice versa*.” Pet. 3, 10 (citing Ex. 1003 ¶ 36).

In its Preliminary Response, “Patent Owner generally concurs with [Petitioner’s] description, though would propose that a POSITA only needs two years of experience [but] does not believe any difference between Patent’s Owner’s view and Petitioners’ view affects the unpatentability analysis.” Prelim. Resp. 24.

We agree with Patent Owner that the difference between Petitioner’s and Patent Owner’s formulations would not affect our analysis of patentability. We preliminarily adopt Petitioner’s formulation, which is supported by expert testimony and is generally consistent with the level of skill reflected in the Specification and the prior art. *See, e.g., Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

B. CLAIM CONSTRUCTION

In an *inter partes* review, the Board construes the terms of a patent claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history

pertaining to the patent.” 37 C.F.R. § 42.100(b); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

For purposes of this Decision, we find it necessary to construe certain terms recited in limitations 4d and 4e of claim 4. Ex. 1001, 36:55–62. Although neither party requests that the Board expressly construe any claim terms (Pet. 9–10; Prelim. Resp. 25), the parties offer opposing implicit constructions with respect to the terms `preambleInitialReceivedTargetPower(0)`, `preambleInitialReceivedTargetPower(1)`, `powerRampingStep(0)`, and `powerRampingStep(1)` (“the disputed terms”).

Petitioner implicitly construes the disputed terms as two values: a common `preambleInitialReceivedTargetPower` and a common `powerRampingStep`. Pet. 31 (citing Ex. 1001, 30:3–5, 7–11) (“The ’207 Patent unequivocally discloses that a ‘[c]ommon `preambleInitialReceivedTargetPower` may be used’ . . . [and] a ‘[c]ommon `powerRampingStep` may be used As a result, `preambleInitialReceivedTargetPower(0)` may be the same as `preambleInitialReceivedTargetPower(1)` and `powerRampingStep(0)` may be the same as `powerRampingStep(1)`.”).

In contrast, Patent Owner implicitly construes the disputed terms as requiring four functions (`preambleInitialReceivedTargetPower(0)`, `preambleInitialReceivedTargetPower(1)`, `powerRampingStep(0)`, and `powerRampingStep(1)`), where `preambleInitialReceivedTargetPower(0)` and `powerRampingStep(0)` are functions of `input(0)` corresponding to the 4-step procedure, and where `preambleInitialReceivedTargetPower(1)` and `powerRampingStep(1)` are functions of `input(1)` corresponding to the 2-step procedure. Prelim. Resp. 28–29 (“the claims . . . require that `preambleInitialReceivedTargetPower()` and a `powerRampingStep()` be a function

of one input (identified as ‘0’) corresponding to the 4-step procedure and another input (identified as ‘1’) corresponding to the 2-step procedure”); *id.* at 26–27 (citing Ex. 2002 ¶¶ 20–25; Ex. 1002, 4066); Ex. 2002 ¶ 25 (“[I]t is clear to a POSITA that the functions `preambleInitialReceivedTargetPower()` and `powerRampingStep()` take different input values for the 4-step (‘0’ input) and 2-step (‘1’ input) procedures to be capable of outputting different values based on the input.”). Patent Owner argues that Petitioner’s construction, requiring only two values and no inputs, would “erroneously remove limitations found in the claims based on one embodiment found in the specification.” *Id.* at 28.

When construing claim terms, we first review the language of the claims. *TQ Delta, LLC v. DISH Network LLC*, 929 F.3d 1350, 1357 (Fed. Cir. 2019). The claim recites four terms: “`preambleInitialReceivedTargetPower(0)`,” “`preambleInitialReceivedTargetPower(1)`,” “`powerRampingStep(0)`,” and “`powerRampingStep(1)`.” Ex. 1001, 36:57–62. These terms represent outputs of, or values dependent on, inputs (0) or (1). *Id.* at 29:30–53; Ex. 2002 ¶¶ 21–23.

Given that claim 4 separately lists initial power values “`preambleInitialReceivedTargetPower(0)`” and “`preambleInitialReceivedTargetPower(1)`,” we are skeptical of Petitioner’s argument that these two values should be construed to mean a single value (i.e., `preambleInitialReceivedTargetPower`), because that would render the separate listing superfluous. Moreover, if the two values “`preambleInitialReceivedTargetPower(0)`” and “`preambleInitialReceivedTargetPower(1)`” were construed to mean single value `preambleInitialReceivedTargetPower`, the additional “(0)” and “(1)” claim language would be superfluous. *See In re Wilson*, 424 F.2d 1382, 1385 (CCPA

1970) (“All words in a claim must be considered in judging the patentability of that claim against the prior art.”); *Dig.-Vending Servs. Int’l, LLC v. Univ. of Phx., Inc.*, 672 F.3d 1270, 1275 (Fed. Cir. 2012) (noting “the importance of construing claim terms in light of the surrounding claim language, such that words in a claim are not rendered superfluous”); *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) (“A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.”); *Elektta Instrument S.A. v. O.U.R. Sci. Int’l, Inc.*, 214 F.3d 1302, 1307 (Fed. Cir. 2000) (construing claim to avoid rendering the 30 degree claim limitation superfluous); *Gen. Am. Transp. Corp. v. Cryo-Trans, Inc.*, 93 F.3d 766, 770 (Fed. Cir. 1996) (rejecting the district court’s claim construction because it rendered superfluous the claim requirement for openings adjacent to the end walls).

For similar reasons, we are skeptical that `powerRampingStep(0)` and `powerRampingStep(1)` should be construed to read on a single `powerRampingStep` value.

We next consider the specification of the ’207 patent (“Specification”). When describing input-dependent initial power, the Specification uses the term “`preambleInitialReceivedTargetPower(m)`” to represent terms “`preambleInitialReceivedTargetPower(0)`” and “`preambleInitialReceivedTargetPower(1)`.” *Id.* at 29:34–66. In contrast, the Specification uses a different term, “`preambleInitialReceivedTargetPower`” when describing “common” initial power. *Id.* at 30:3–11. Thus, the Specification uses different terminology for initial power depending on whether the initial power parameter is input-dependent (a function) or common (a single value). *Id.* Similarly, the Specification uses different terminology for power ramping step size depending on whether the step size parameter is input-

dependent or common. *Id.* Furthermore, in another passage, the Specification uses the term “common” with respect to a counter parameter, stating that “a common transmission counter (PREAMBLE_TRANSMISSION_COUNTER) may be used regardless of the selected type/form of random access procedure.” Ex. 1001, 27:60–63; 28:13–15. Thus, the Specification explicitly discloses, in Equation 6, a first embodiment having a *common* PREAMBLE_TRANSMISSION_COUNTER *value* in combination with *input-dependent* initial power and power ramping *functions* (i.e., preambleInitialReceivedTargetPower(m) and powerRampingStep(m)). Ex. 1001, 26:14–41. The Specification implicitly discloses an alternative embodiment having a *common* PREAMBLE_TRANSMISSION_COUNTER *value* in combination with *common* initial power and power ramping *values* (i.e., preambleInitialReceivedTargetPower and powerRampingStep). The challenged claims recite preambleInitialReceivedTargetPower(*m*) and powerRampingStep(*m*), which are functions, not preambleInitialReceivedTargetPower and powerRampingStep. Because the claims include the terminology used in the Specification to describe the first embodiment but not the alternative embodiment, which lacks initial power and power ramping functions, the challenged claims do not appear to cover the alternative embodiment. *See, e.g., PPC Broadband, Inc. v. Corning Optical Commc’ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016) (rejecting the proposition that “each and every claim ought to be interpreted to cover each and every embodiment”).

The prosecution history for the ’207 patent provides additional evidence that the claims should not be construed to include a common initial power value and a power ramping value. *See e.g.,* Ex. 1002, 4109 (finding by the Examiner

that the cited prior art lacks “different power ramping step (powerRampingStep(0) and powerRampingStep(1))”).

After reviewing the record, Petitioner has not provided a sufficient basis for construing the disputed terms to include common initial power and power ramping. Similar to Patent Owner’s implicit construction, we preliminarily construe the disputed terms as being four separate elements (preambleInitialReceivedTargetPower(0), preambleInitialReceivedTargetPower(1), powerRampingStep(0), and powerRampingStep(1)), where preambleInitialReceivedTargetPower(0) and powerRampingStep(0) are functions of input(0), and where preambleInitialReceivedTargetPower(1) and powerRampingStep(1) are functions of input(1).

However, we preliminarily decline to adopt Patent Owner’s full implicit construction of the disputed terms, which also requires that input(0) “corresponds to the 4-step procedure” and input(1) “corresponds to the 2-step procedure.” *See, e.g.*, Prelim. Resp. 29 (“[T]he claim limitations require the two separate functions that have a definition for at least the two inputs, 0 and 1, corresponding to the 4- and 2-step process, respectively.”). In our view, construing, for example, “preambleInitialReceivedTargetPower(0)” as having an input corresponding to the 4-step procedure would improperly import limitations from the Specification into the claims. *See SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) (“Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim.”).

Aside from the disputed terms discussed above, limitations 4d and 4e include additional language (e.g., “for the 4-step . . . for the 2-step”). At this stage, we see no reason to explicitly interpret the meaning of the additional language. Accordingly, no other express claim construction analysis is necessary for our decision to institute an *inter partes* review apart from that discussed in our analysis below. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (holding that only terms in controversy must be construed “and only to the extent necessary to resolve the controversy”) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

C. OVERVIEW OF ASSERTED PRIOR ART

1. *Lee1 (Ex. 1005)*

Lee1 “define[s] [a] 2-step random access procedure in order to minimize latency of the related art 4-step random access procedure.” Ex. 1005 ¶ 6. Lee1 explains that random access procedure occurs during a RRC connection establishment procedure. *Id.* at ¶¶ 32, 122–123; Fig. 8.

Figure 9 below illustrates a 4-step contention-based random access procedure. Ex. 1005 ¶ 33.

[Fig. 9]

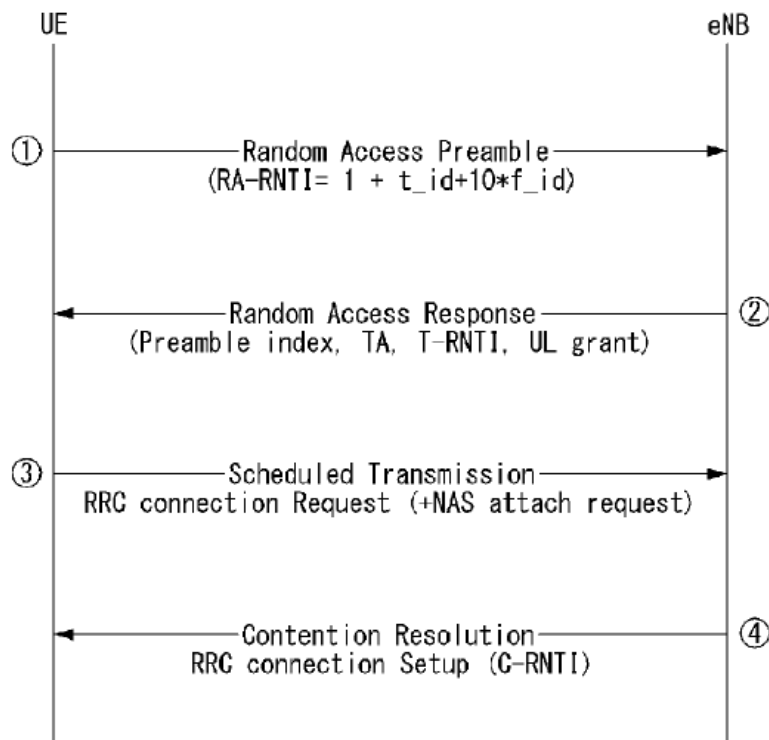


Figure 9, above, describes that the random access procedure may include four steps: 1) a step in which the terminal (UE) transmits a random access preamble to the base station (eNB), 2) a step in which a random access response is received from the base station, 3) a step in which an uplink message (scheduled transmission) is transmitted using information received in the random access response message, and 4) a step in which a message (contention resolution) corresponding to the uplink message is received from the base station. Ex. 1005 ¶ 123. When the UE receives contention resolution in step 4, the UE has successfully completed the random access. *Id.* ¶ 125.

In its description of the 4-step procedure, Lee1 explains that, in the first step, the terminal sets transmission power of the random access preamble, `PREAMBLE_RECEIVED_TARGET_POWER`, to the following:

(‘preambleInitialReceivedTargetPower’ + ‘DELTA_PREAMBLE’ +
(‘PREAMBLE_TRANSMISSION_COUNTER’? 1) *
‘powerRampingStep’).

Ex. 1005 ¶ 152. Lee1 explains that “preambleInitialReceivedTargetPower” indicates initial transmission power, “DELTA_PREAMBLE” indicates a power offset value according to a preamble format, “PREAMBLE_TRANSMISSION_COUNTER” indicates the number of preamble transmissions, and “powerRampingStep” indicates a power ramping factor. *Id.* The terminal receives these values in system information from the base station. *Id.*

Lee1 also discloses that “the existing random access procedure of 4 steps may be decreased to 2 steps, thereby minimizing overall latency in an initial access procedure.” Ex. 1005 ¶¶ 249. In step 1 of the 2-step procedure, the UE transmits a RACH preamble and RRC/NAS request to the eNB. *Id.* ¶ 317, Fig. 22. In response to the RRC/NAS request message, the eNB transmits a response message to the UE in step 2. *Id.* ¶ 327.

2. *Lee2 (Ex. 1006)*

Lee2’s method and apparatus “transmit and receive a random access preamble in a wireless communication system.” Ex. 1006, code (57).

As seen in Figure 3 below, the user equipment transmits a random access preamble to a base station in the first step of a 4-step contention based random access procedure.

÷ FIG . 3

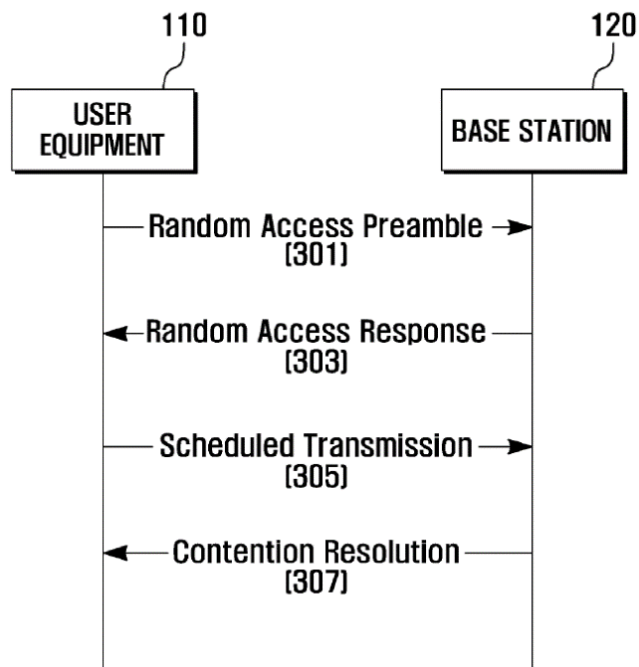


Figure 3, above, describes a 4-step procedure in which user equipment 110, in the first step, transmits random access preamble 301 to base station 120. Ex. 1006 ¶ 45. The base station then transmits random access response 303, the user equipment then transmits scheduled transmission 305, and the base station then transmits contention resolution message 307. *Id.* ¶ 52–53.

Before the user equipment transmits the preamble in the first step, the base station transmits, to the user equipment, parameters for performing the random access corresponding to events (i.e., idle to connected mode transition, RRC connection re-establishment, handover, and downlink/uplink (DL/UL) data resume). Ex. 1006 ¶ 28–29, Fig. 4. The user equipment stores the parameters, and when an event occurs, the user equipment performs random access according to the parameter set in accordance with the event. *Id.* ¶ 60.

The parameters include initial transmission power (Preamble_Intial_Power_n) and ramping power (Ramping_Power_n). Ex. 1006

¶¶ 30, 59. Preamble_Intial_Power_n refers to a transmission power value of a preamble that is initially transmitted, and Ramping_Power_n refers to a transmission power value that is increased when ramping is performed.

Id. ¶ 31–32.

When an event triggering random access has occurred, the user equipment transmits a random access preamble to the base station using transmission power corresponding to the event. Ex. 1006 ¶ 45. For example, if the event corresponds to handover (where the user equipment is located at a cell edge furthest from the serving base station), Lee2’s user equipment measures Reference Signal Received Power (RSRP) and transmits a measurement report message to the base station, which determines a handover. *Id.* ¶¶ 10, 63–64, 71–74. The user equipment then transmits the preamble using initial power and power ramping specific to a handover event. *Id.* ¶¶ 39–40, 45, 50.

D. LEGAL PRINCIPLES

A claim is unpatentable under § 102 as anticipated if a single prior art reference either expressly or inherently discloses every limitation of the claim. *Orion IP, LLC v. Hyundai Motor Am.*, 605 F.3d 967, 975 (Fed. Cir. 2010). A claim is unpatentable under § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103; *see KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). When a ground in a petition is based on a combination of references, we consider “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *Id.* at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). We base our obviousness inquiry on factual

considerations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) any objective indicia of obviousness or non-obviousness that may be in evidence. *See Graham*, 383 U.S. at 17–18.

E. OBVIOUSNESS OVER LEE1 AND LEE2

Petitioner contends that claims 4–6 and 8 are unpatentable under § 103 as obvious over Lee1 and Lee2. Pet. 36–44.

1. *Claim 4*

We focus our analysis on independent claim 4. For the reasons explained below, we determine that Petitioner has shown a reasonable likelihood that claim 4 is rendered obvious over Lee1 and Lee2 (“Lee1–Lee2”).

(a) Disputed Limitations 4e and 4d: Petitioner’s Contentions

We begin our analysis on disputed limitations 4d and 4e.

Limitation 4d recites “for the 4-step contention based random access procedure, the PREAMBLE_RECEIVED_TARGET_POWER is given based at least on a preambleInitialReceivedTargetPower(0) and a powerRampingStep(0).” Ex. 1001, 36:55–58.

Limitation 4e recites “for the 2-step contention based random access procedure, the PREAMBLE_RECEIVED_TARGET_POWER is given based at least on a preambleInitialReceivedTargetPower(1) and a powerRampingStep(1).” Ex. 1001, 36:59–63.

We construed these limitations as requiring four functions (i.e., preambleInitialReceivedTargetPower(0), preambleInitialReceivedTargetPower(1), powerRampingStep(0), and powerRampingStep(1)) of inputs (0) or (1). *See* Section III.B above.

Petitioner identifies Lee1's 4-step contention based random access procedure, where PREAMBLE_RECEIVED_TARGET_POWER is given by preambleInitialReceivedTargetPower and powerRampingStep values. Pet. 27–29 (citing Ex. 1003 ¶¶ 69–77; Ex. 1005 ¶ 152), 39. Petitioner contends that “[b]ecause preamble transmission is part of both 2-step and 4-step random access procedure, Lee1's disclosure that preamble transmission power is based on preambleInitialReceivedTargetPower and a powerRampingStep” applies to or would be obvious to extend to Lee1's 2-step random access procedure. *Id.* at 30; *see also id.* at 29–31 (citing Ex. 1005 ¶¶ 152, 241, 249, 315; Ex. 1003 ¶¶ 46, 48, 56, 70–73, 77).

In addition, Petitioner identifies Lee2's 4-step procedure using different “power control parameters” (i.e., initial power and ramping power functions) for different types of random access (i.e., idle to connected mode transition, RRC connection re-establishment, handover, and DL/UL data resume). *Id.* at 40; *see also id.* at 40–42 (citing Ex. 1006 ¶¶ 28–32, 45, 48–51, 59–60, 109).

Petitioner explains that both Lee1 and Lee2 are concerned with “reduc[ing] latency (i.e., time delay) due to random access.” Pet 37–38 (citing Ex. 1003 ¶¶ 86–93, Ex. 1005 ¶¶ 3, 6, 152, 249, Fig. 9; Ex. 1006 ¶¶ 7, 11, 31–32, 42, 109, Fig. 3). Petitioner explains that the references “approach[] this issue from . . . different angle[s].” *Id.* at 37–38 (“Lee1 addresses this . . . by reducing the number of steps . . .”) (“Lee2 teaches that ‘set[ting] different power ramping and initial transmission power of a random access preamble, according to the condition of user equipment . . . reduces the time delay due to random access’” (quoting Ex. 1006 ¶ 109)). Petitioner contends “a POSITA would have been motivated to combine Lee1 with Lee2 to enable a larger reduction in time delay due to random access than either reference can achieve on its own.”

Id. at 38; *id.* at 42 (“Based on Lee2’s disclosure that using different transmission power control parameters for different types of random access procedure reduces time delay and improves system performance . . . a POSITA would have been motivated to use values for preambleInitialReceivedTargetPower(0) and powerRampingStep(0) in Lee1’s 4-step contention-based random access procedure that differ from the values of preambleInitialReceivedTargetPower(1) and powerRampingStep(1) in Lee1’s 2-step contention-based random access procedure.”).

Petitioner further contends that the combination would have had a reasonable expectation of success because Lee1 and Lee2 have “interrelated teachings,” e.g., both references disclose “contention-based random access procedures,” “determining transmission power of a random access preamble in a wireless communication,” and “calculating the transmission power of a random access preamble using an initial transmission power and a power ramping step.” Pet. 37 (citing Ex. 1003, 86–89; Ex. 1005 ¶ 152, Fig. 9; Ex. 1006 ¶¶ 7, 31–32, Fig. 3).

(b) Limitations 4d and 4e: Patent Owner Arguments; Analysis

We now address Patent Owner’s arguments in response to Petitioner’s contentions with respect to limitations 4d and 4e, along with our preliminary analysis of the parties’ arguments.

According to Patent Owner, the combination (and more specifically, Lee1) does not teach or suggest power ramping in a 2-step procedure. Prelim. Resp. 30–32, 36 (explaining that Lee1 teaches power ramping only in the context of a 4-step procedure). Patent Owner further argues that Petitioner’s expert “provided no reasoning why a POSITA would apply [Lee1’s] 4-step power ramping to Lee1’s 2-step procedure.” *Id.* at 33.

Although Lee1 does not explicitly discuss power ramping in the context of the 2-step procedure, we are sufficiently persuaded at this stage that it would have been obvious. Lee1's 2-step and 4-step procedures are similar, with the 2-step procedure combining the steps from the existing 4-step procedure, and both procedures having preamble transmission in step 1. Pet. 29–30 (citing Ex. 1005 ¶¶ 152, 241, 249, 315; Ex. 1003 ¶¶ 70–73); Ex. 1003 ¶¶ 71–72 (“[A] skilled artisan would know that Lee1’s teachings regarding random access preambles, including the methodology for transmission power control . . . are generally applicable regardless of the total number of steps that are necessary to complete random access.”) (“Lee1 teaches that the random access preamble is transmitted in the first step of random access in both the 4-step and the 2-step embodiments of the procedure”). On this record, having shown the two procedures are comparable, e.g., they both have transmission of random access preambles in step 1, Petitioner’s expert testimony provides a sufficient rationale as to why a POSITA would have included 4-step power ramping into the 2-step procedure (i.e., “power ramping is necessary to minimize interference caused by the transmission of random access preambles and to achieve a connection in an energy efficient manner”). Pet. 30 (citing Ex. 1003 ¶¶ 46, 48, 56, 70–73, 77); *see also* Ex. 1003 ¶ 77 (“[P]ower ramping plays an important role because it allows the mobile device to connect to the network in an energy efficient manner while causing minimal interference to other transmission This is why power ramping has been used in every cellular standard since 3G.”).

We preliminarily disagree with Patent Owner’s related argument that Lee1 does not teach or suggest power ramping in its 2-step procedure because, in the 2-step procedure, “the response message to the RRC/NAS request message *is immediately received in the second step.*” Prelim Resp. 31 (citing

Ex. 1005 ¶ 327). According to our understanding of Lee1, Patent Owner mischaracterizes the reference. Here, Lee1 simply explains that, unlike the 4-step procedure, in which the response message is received in step 4 after intervening steps 2 and 3, in the 2-step procedure, the response message is received “immediately” after successful completion of step 1. Ex. 1005 ¶ 327. Moreover, when there is an *unsuccessful* attempt in step 1 of the 4-step procedure, power ramping occurs. Ex. 1003 ¶¶ 47–48 (power ramping “systematically increases the transmission power of the random access preamble for each unsuccessful random access attempt” at step 1). Absent argument or evidence to the contrary, it is logical that the 2-step procedure would encounter similar instances of unsuccessful attempts in step 1 and thus benefit from power ramping.

We also preliminarily disagree that the Examiner considered whether it would have been obvious to incorporate power ramping into the 2-step procedure. Patent Owner explains that “during prosecution the Examiner was well aware that 4-step RACH procedures used power ramping, but found that this did not anticipate or make the claims obvious.” Prelim. Resp. 33 (citing Ex. 1002 at 4034–41). According to our review of the prosecution history, the Examiner did not directly consider whether it would have been obvious to incorporate 4-step power ramping into the related 2-step procedure; rather, the Examiner determined that none of the cited prior art taught or suggested *different* power ramping for the 4-step and 2-step contention-based procedures. Ex. 1002 at 4034–41. We further note that Petitioner relies on Lee2, a reference not considered during prosecution, for teaching different power ramping.

Based on the forgoing, we are sufficiently persuaded at this stage that it would have been obvious to incorporate Lee1's 4-step power ramping into Lee1's 2-step procedure.

Patent Owner also make various arguments regarding Petitioner's reason to combine Lee1 and Lee2. Prelim. Resp. 36–40.

To the extent Patent Owner argues that the Lee1–Lee2 combination does not teach or suggest the disputed limitations because 1) Lee1 does not teach or suggest “parameterized initial[power]/ramping step” (i.e., different initial power and different power ramping), and 2) Lee2 does not contemplate a 2-step procedure, we do not agree. Prelim. Resp. 36. Piecemeal analysis of the references cannot show non-obviousness. As discussed above, Petitioner relies on 1) Lee2 for different initial power and different power ramping, and 2) Lee1 for a 2-step procedure. Pet. 29–31, 40–42.

Patent Owner next argues that Petitioner did not show a reasonable expectation of success and sufficient motivation for the Lee1–Lee2 combination, because Lee1's initial power and power ramping is *dependent on event or distance, not procedure type (4-step or 2-step)*. Prelim. Resp. 38 (explaining “Lee2 uses different parameters based upon distance, not the UE's number of steps to perform in response to the event”); *id.* (“UE is physically the same distance from a base station regardless of whether the UE is performing a 2-step or 4-step connection procedure, so Lee2's distance rationale for having different power parameters for the cases is no rationale to have different power parameters for 2- and 4-step connection procedures.” (emphasis omitted)).

The obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art

would employ.” *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Because the prior art need not explicitly disclose or explicitly suggest the proposed modification (here, at least according to Patent Owner, making initial power and power ramping dependent on procedure type), the absence of precise teachings regarding the proposed modification does not undermine the grounds of unpatentability. Lee2 discloses initial power and power ramping functions dependent on input. Ex. 1006 ¶¶ 63, 71–74. Specifically, Lee2 discloses using, based on measured signal power (RSRP), event/distance as input for initial power and power ramping. *Id.* Lee2 does not, nor could it, address using procedure type as input for initial power and power ramping because Lee2 only discloses 1 type of procedure—the conventional 4-step. Ex. 1006, Fig. 3.

Per Lee1, reducing from the conventional 4-step to 2-step is a development in the technology to reduce time delay. Ex. 1005 ¶ 6. Although not discussed in Lee1, the prosecution history shows that switching from 4-step to 2-step is similarly based on measured RSRP. Prelim. Resp. 39 (discussing prosecution history); Ex. 4039–40. Patent Owner’s declarant also acknowledges that there is a correlation (albeit unreliable) between RSRP and distance. Ex. 2002 ¶ 27 (“RSRP may or may not correspond to distance in the real world due to various wireless artifacts . . .”). Accordingly, we are preliminarily persuaded that a person of ordinary skill in the art, facing the needs created by the development of new types of procedures (i.e., the 2-step), and upon recognizing the link between event/distance, procedure type, and measured RSRP, would have, in light of Lee2, seen a benefit and had a reasonable expectation of success in using initial power and power ramping functions dependent on procedure type.

With respect to Patent Owner’s argument that “Petitioners have not explained why a POSITA would ignore Lee2’s actual teaching [of using event/distance] to use the procedure type,” as explained above, Lee2 only teaches one procedure, the conventional 4-step procedure, and thus could not address multiple procedure types based on improvements to the technology in reducing the number of procedure steps. Prelim. Resp. 39. Patent Owner’s argument disregards the additional Lee1 reference and its teaching of there being more than one type of procedure.

Patent Owner further argues that Petitioner has not addressed the inherent conflict and difficulties that might occur when using two variables (procedure type and event/distance inputs) for initial power and power ramping functions. Prelim. Resp. 39 (explaining that “a ‘low power’ 4-step procedure would be in tension if the 4-step procedure was a ‘high power’ handoff”); Ex. 2002 ¶ 28 (discussing whether the combination would employ two power control decisions or a single decision). The preliminary evidence of record does not suggest that solving these alleged technical issues would have been beyond the level of ordinary skill in the art. *See KSR*, 550 U.S. at 418. In our view, solutions such as modifying single-variable functions to be multivariable functions or prioritizing power control decisions seem within the skill of a POSITA.

Even assuming that Patent Owner is correct that it would not have been obvious for Lee1’s initial power and power ramping to be dependent on procedure type, we are, nevertheless, persuaded that Lee1–Lee2 renders obvious claim 4. Based on the claim construction we set forth above, claim 4 does not actually require initial power and power ramping correspond to or be *dependent on procedure type*. *See* Section III.B above. Claim 4 merely requires that the initial power and power ramping functions are different “for the 4-step” and “for

the 2-step” procedures. Stated differently, in claim 4, the initial power and power ramping are dependent on input(*m*). Input(*m*) is not limited to procedure type and can include other types of input. Based on our review of the record, combining Lee1 and Lee2 would have resulted in multiple scenarios that meet the claim language where input(*m*) is *dependent on event type*, as explicitly taught by Lee2. Ex. 1006 ¶ 49. For example, where handover is *m*=0 and RCC connection re-establishment is *m*=0, the claim is met when a handover event triggers the conventional 4-step procedure with transmission power given based on preambleInitialReceivedTargetPower(0) and powerRampingStep(0), and RCC connection re-establishment triggers the improved 2-step procedure with transmission power given by preambleInitialReceivedTargetPower(1) and powerRampingStep(1). We further note that Patent Owner’s declarant acknowledges that this scenario would occur in the combination as proposed. Ex. 2002 ¶¶ 27–28 (testifying that “any of the different events could rely on a two or four step access procedure”) (“With 2-step and 4-step access procedures being possible with each event contemplated by Lee2 . . .”).

Patent Owner also alleges improper hindsight analysis. Prelim Resp. 39–40. However, the evidence does not suggest that Petitioner engaged in improper hindsight reasoning to arrive at the claimed configuration. The evidence suggests that Lee1 teaches or suggests all the features of claim 4, including 4- and 2-step procedures, except for the initial power and ramping powers being different for the 4- and 2-step procedures. Ex. 1005 ¶¶ 152, 249, 315. Lee2 teaches using different initial power and ramping powers dependent on event/distance. Ex. 1006 ¶ 49. Combining Lee1 and Lee2 results in a 4-step procedure and a 2-step procedure having different initial power and ramping powers. For example, as discussed above, combining Lee1 and Lee2 results in a

4-step procedure with initial power and ramping power functions set in accordance for a handover event, and a 2-step procedure having different initial power and ramping power functions set in accordance for an RCC connection re-establishment event. Petitioner also provides a sufficiently persuasive rationale to combine Lee1 and Lee2: to reduce time delay. Pet. 38, 42. At this juncture, the evidence shows this rationale was not outside of the knowledge within the level of ordinary skill in the art at the time the claimed invention was made nor was gleaned only from the '207 patent. *See* Ex. 1003 ¶¶ 88–89 (discussing Lee1's and Lee2's proposed solutions for reducing time delay); *see also In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) (“Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper.”).

In summary, we are persuaded, on this record, that Lee1–Lee2 teaches limitations 4d and 4e, for the reasons discussed above.

(c) Undisputed Limitations 4pre–4c

At this stage, Patent Owner does not dispute Petitioner's contentions regarding limitations 4pre–4c, which are discussed briefly below.

Limitation 4pre recites “A base station device comprising.” Ex. 1001, 36:43. Petitioner identifies Lee1's base station (BS) or enhanced Node B (eNode B or eNB). Pet. 17 (citing Ex. 1005 ¶¶ 33, 55).

Limitation 4a recites “control circuitry configured to control a 2-step contention based random-access procedure and a 4-step contention based random-access procedure,” which Petitioner identifies in Lee1 as processor 2811

and memory 2823, which control 4-step and 2-step contention based random access procedures. Ex. 1001, 36:44–46; Pet. 18–21 (citing Ex. 1005 ¶¶ 6, 46–51, 150, 152, 225–229, 249, 315–316, 386–387, Figs. 9, 22–27, 28; Ex. 1003 ¶¶ 59–60, 63–65).

Limitation 4b recites “reception circuitry configured to receive a physical random access channel with a random access preamble in a first step of the 2-step contention based random access procedure or in a first step of the 4-step contention based random-access procedure.” Petitioner identifies in Lee1 1) RF unit 2813 to receive random access preambles, 2) that a UE may transmit a preamble via a PRACH to the base station, and 3) that a base station is configured to receive a random access preamble in both 2-step and 4-step contention-based random access. Ex. 1001, 36:47–51; Pet. 21–25 (citing Ex. 1005 ¶¶ 6, 93, 152–153, 249, 317, 386–387, Figs. 9, 22, 28; Ex. 1003 ¶¶ 66–67).

Limitation 4c recites “transmission power for the physical random access channel is given based at least on a PREAMBLE_RECEIVED_TARGET POWER,” which Petitioner identifies in Lee1 as PREAMBLE_RECEIVED_TARGET_POWER, which is calculated based on the values of preambleInitialReceivedTargetPower, powerRampingStep, and other inputs. Ex. 1001, 36:52–54; Pet. 25–26 (citing Ex. 1005 ¶ 152; Ex. 1003 ¶ 68).

At this stage, Patent Owner does not specifically contest Petitioner’s contentions with respect to limitations 4pre–4c (*see* Prelim. Resp.), and we are persuaded that Lee1–Lee2 teaches or suggests each of these limitations, for the reasons given by Petitioner. Pet. 17–26, 39.

(d) Conclusion as to Claim 4

For the above reasons, we determine that Petitioner has shown, sufficiently persuasively at this stage, that Lee1–Lee2 renders claim 4 obvious. We therefore determine that Petitioner is reasonably likely to prevail in showing that claim 4 is unpatentable.

2. *Claims 5, 6, and 8*

For claims 5, 6, and 8, Petitioner advances arguments mapping with particularity every claim limitation to disclosures in Lee1–Lee2. Pet. 32–36, 43–44.

At this stage in the proceeding, Patent Owner does not contest those arguments except to contend that Lee1–Lee2 does not suggest limitation 8e of claim 8. Prelim. Resp. 41. Limitation 8e includes the same subject matter as limitation 4e. Ex. 1001, 36:59–62, 38:22–25. For similar reasons discussed above with respect to limitation 4e, we are sufficiently persuaded at this stage that Lee1–Lee2 suggests limitation 8e. We therefore determine that Petitioner is reasonably likely to prevail in showing that claims 5, 6, and 8 are unpatentable.

IV. OTHER GROUNDS

Because Petitioner has shown a reasonable likelihood of prevailing with respect to claims 4–6 and 8 based on obviousness over Lee1–Lee2, we will institute on all claims and all grounds raised in the Petition. 37 C.F.R. § 42.108(a) (“When instituting . . . review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”); *see SAS*, 138 S. Ct. at 1359–60; *AC Techs. S.A. v. Amazon.com, Inc.*, 912 F.3d 1358, 1364 (Fed. Cir. 2019) (“[I]f the Board

institutes an IPR, it must . . . address all grounds of unpatentability raised by the petitioner.”).

Petitioner also contends that claims 4–6 and 8 are unpatentable under § 102 as anticipated by or under § 103 as obvious over Lee1 alone. Pet. 17–36. Petitioner’s contentions are premised on a claim construction that we preliminarily determine to be incorrect. *See* Section III.B above. Thus, Petitioner has not shown, on this record, that Lee1 anticipates or alone renders obvious claims 4–6 and 8.

V. CONCLUSION

We determine that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition, and we institute *inter partes* review.

Any argument not raised in a Patent Owner Response to the Petition, or as permitted in another manner during trial, shall be deemed waived even if asserted in the Preliminary Response. In addition, nothing in this Decision authorizes Petitioner to supplement information advanced in the Petition in a manner not permitted by the Board’s Rules.

VI. ORDER

In consideration of the foregoing, it is hereby

ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review of all challenged claims of the ’207 patent is instituted on all grounds of unpatentability set forth in the Petition; and

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

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