

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, RUSSELL E. CASS, and
MARY C. HOFFMAN, *Administrative Patent Judges*.

HOFFMAN, *Administrative Patent Judge*.

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

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.”). Applying the standard set forth in 35 U.S.C. § 314(a), we instituted an *inter partes* review as to all claims and grounds set forth in the Petition. Paper 9 (“Inst. Dec.”).

After institution, Patent Owner filed a Patent Owner Response (Paper 11, “PO Resp.”), Petitioner filed a Reply to Patent Owner’s Response (Paper 12, “Reply”), and Patent Owner filed a Sur-reply (Paper 13, “Sur-reply”). We held an oral hearing on June 12, 2025, and the transcript (Paper 23, “Tr.”) is of record.

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the challenged claims. For the reasons explained below, we determine Petitioner has shown, by a preponderance of the evidence, that challenged claims 4–6 and 8 of the ’207 patent are unpatentable.

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.

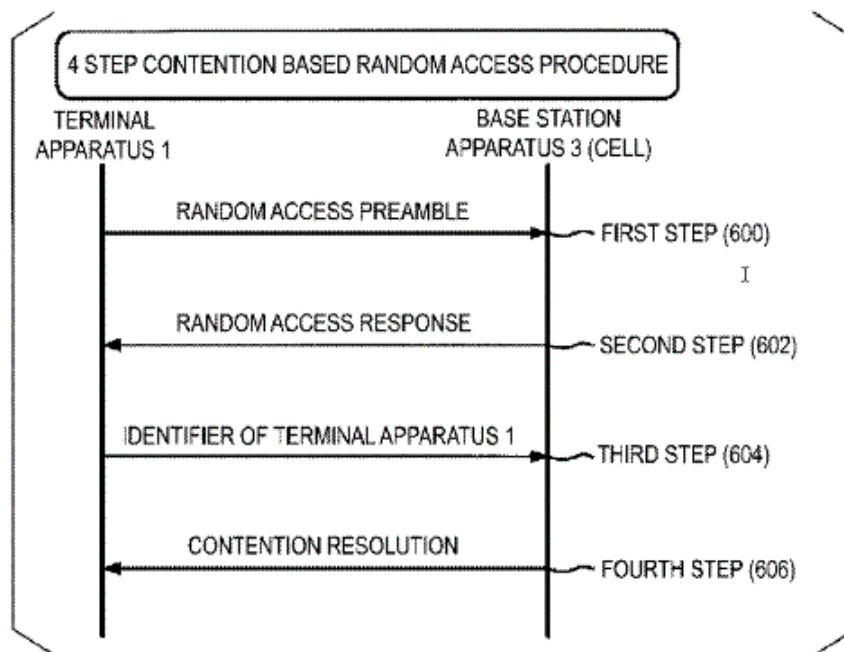


FIG. 6

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, 6:47–53, 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.*

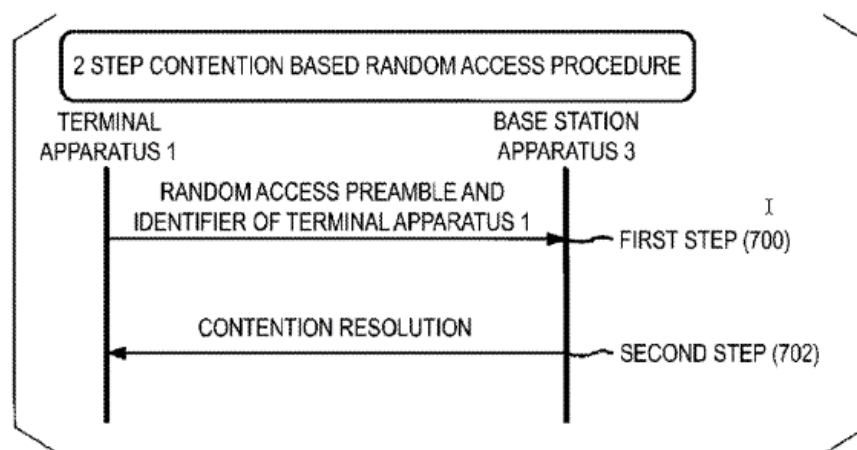


FIG. 7

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 (e.g., 2-step or 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 (*italics added for emphasis*):

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

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

- [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 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.

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”).

In support of its arguments, Petitioner relies on a declaration of Dr. Mark Mahon. Ex. 1003. Patent Owner relies on declarations of Dr. Karthikeyan Sundaresan. Exs. 2002, 2004.

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 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 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).

We now turn to the claim construction disputes presented in this *inter partes* review.

1. *Whether terms “preambleInitialReceivedTargetPower(0),” “powerRampingStep(0),” “preambleInitialReceivedTargetPower(1),” and “powerRampingStep(1)” require more than two elements*

Petitioner has abandoned its original claim-construction and now adopts the Board’s construction set forth in the Institution Decision. Reply 2–3 (citing Inst. Dec. 13). In our Institution Decision, we interpreted claim terms, “preambleInitialReceivedTargetPower(0),” “powerRampingStep(0),” “preambleInitialReceivedTargetPower(1),” and “powerRampingStep(1)” (“the disputed terms”), as functions with inputs “0” or “1,” and thus four separate elements. *See* Inst. Dec. 10–13 (rejecting Petitioner’s argument that the disputed terms are met by two elements—a common preambleInitialReceivedTargetPower value and a common powerRampingStep value) (explaining that, e.g., “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”) (further explaining that neither the Specification nor the prosecution history supports construing the four disputed terms as two elements). Both parties now agree that the claim requires more than two elements, i.e., more than a common preambleInitialReceivedTargetPower value and a common powerRampingStep value. Reply 2–3; PO Resp. 26–30.

2. *Whether input corresponds to or is based on procedure type*

The remaining claim-construction dispute is whether claim 4⁵ requires that inputs “0” and “1” (and associated functions) “correspond” to procedure type (i.e., the 4-step and 2-step contention-based procedure types). *See* Sur-reply 3. In our Institution Decision, focusing on the disputed terms, we preliminarily determined that the claim does not require that inputs correspond to procedure type. Inst. Dec. 13; *id.* at 26–27 (explaining that input could instead, for example, correspond to event type).

Patent Owner concedes that the disputed terms in and of themselves do not specify that inputs correspond to procedure type. *See* Sur-reply 6–7. Instead, Patent Owner points to the additional claim language “for the 4-step . . . procedure” and “for the 2-step . . . procedure” (“the ‘for’ recitations”). *Id.*; PO Resp. 30–34. Patent Owner argues the “for” recitations require that inputs are *set based upon* procedure type such that *for all* 4-step procedures, the input is “0,” and *for all* 2-step procedures, the input is “1.” *See* PO

⁵ Claim 8 recites similar limitations. Ex. 1001, 38:18–25.

Resp. 30; Tr. 33:25–34:15. In other words, Patent Owner argues that “for the 4-step . . . procedure” should be interpreted as “for all 4-step procedures,” and likewise, “for the 2-step . . . procedure” as “for all 2-step procedures.” *Id.*

Looking first at the claim language itself, Patent Owner’s construction is unduly narrow. The “for” recitations derive antecedent basis from limitation 4a. Ex. 1001, 36:44–45. Limitation 4a recites “a 4-step” procedure and “a 2-step” procedure. Thus, the claim includes one of each procedure type: “one” 4-step and “one” 2-step (i.e., *single* instances of each procedure). Patent Owner similarly reads the claim as requiring “one or more” of each procedure type. *See* Tr. 33:19–34:4.

Because limitation 4a provides antecedent basis for a singular 4-step procedure and a singular 2-step procedure, this strongly suggests that the claim requires *for the one* (or for the single) 4-step procedure but not for all 4-step procedures, and *for the one* (or for the single) 2-step procedure but not for all 2-step procedures. At trial, Patent Owner’s interpretation was similar, stating, “that would read. . . as *for the one or more* 4-step . . . procedure and *for the one or more* 2-step . . . procedure.” *See* Tr. 33:25–34:4 (emphasis added). In seeming contradiction, Patent Owner also stated, “I read that as being . . . *all* 4-step contention random access procedures . . . and *all* 2-step random access based procedures.” *Id.* (emphasis added). We note that Patent Owner does not, however, cite any legal precedent for interpreting “one or more” as requiring “all,” or provide reasoning for departing from the default claim construction principle that “one or more” includes “one.”

For this reason and for reasons further discussed below, construing “for the 4-step” to mean “for all 4-step,” and “for the 2-step” to mean “for all 2-step,” 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.”).

Patent Owner’s expert, Dr. Sundaresan, testifies that “the ‘for’ refers to *the cases of* 4-step . . . and 2-step.” Ex. 2004 ¶ 3 (emphasis added). This, however, is at odds with the claim language. As discussed above, based on the actual words of the claim, “for the 4-step . . . procedure . . . for the 2-step . . . procedure” includes for a single 4-step procedure and for a single 2-step procedure. Dr. Sundaresan does not point to any claim language for limiting the “for” recitations to “the cases of” (i.e., all) 4-step and 2-step procedures. *See id.*

Nor does Dr. Sundaresan persuasively explain why, when read in light of the Specification, the claims exclude input based on something other than procedure type. We disagree with Patent Owner’s argument that “[t]he specification uses the same awkward ‘for’ language as used in the claims” such that a POSITA would have understood that inputs are set based on procedure type. PO Resp. 30–31 (citing Ex. 2004 ¶¶ 3–5; Ex. 1001, 29:51–57). First, the claim language (“for the 4-step” and “for the 2-step”) is not the “same” as that used in the Specification (“m is 0 for the 4 step . . . and m is 1 for the 2 step.”). Ex. 1001, 29:54–57. The claim uses less precise phrasing than the Specification to describe the preferred embodiment, demonstrating that the patentee knew how to correspond input to procedure

type yet chose not to do so. Second, a claim is not limited to disclosed embodiments, and we see no evidence that the Specification excludes inputs set based on something other than procedure type. Third, we agree with Petitioner that the relevant claim language is “relatively straightforward,” not awkward. Reply 6. The term “for” is commonplace (appearing countless times in the ’207 patent in varied use) and readily understandable.

We also disagree with Patent Owner’s other argument with respect to the Specification. Referring to the Specification’s disclosure of DELTA_PREAMBLE(F), Dr. Sundaresan drew a parallel between inputs *m*—“0” and “1”—and input *F*. Ex. 2004 ¶ 5 (stating “just like *F* ‘corresponds’ to a PRACH format (F) for DELTA_PREAMBLE, ‘*m*’ corresponds to [procedure type]”). Patent Owner argues that a “POSITA would recognize the same treatment” of these inputs. PO Resp. 32. We do not find this persuasive because the Specification explicitly states that “DELTA_PREAMBLE(F) *may* correspond to a PRACH format (F) (emphasis added).” Ex. 1001, 30:14–15. Dr. Sundaresan’s testimony does not address the permissive term “may.” See Ex. 2004 ¶ 5. At trial, Patent Owner conceded that the Specification is permissive as to whether *F* corresponds to a PRACH format (F). See Tr. 32:25–33:7. Thus, as Petitioner correctly argues, if we consider inputs “*F*,” “0,” and “1” according to the same treatment, by Patent Owner’s own logic, inputs “0” and “1” *may*, but do not necessarily, correspond to procedure type. See Tr. 48:8–14.

Moreover, the Specification’s disclosure that input “*F*” may correspond to format type provides further evidence that inputs may correspond to something other than procedure type.

We are also not persuaded by Patent Owner’s argument that the Examiner indicated that inputs “0” and “1” were associated with the 4-step and 2-step procedures. PO Resp. 32–33 (citing Ex. 1002 at 4038–40). According to our review of the prosecution history, the Examiner merely indicated that the cited prior art lacked different inputs for a 4-step procedure and a 2-step procedure but did not address whether inputs are set based on procedure type, i.e., whether input “0” is associated with all 4-step procedures and whether input “1” is associated with all 2-step procedures. Ex. 1002 at 4038–40.

Patent Owner also points to Petitioner’s explanation of prior art reference Lee2 to show that the parties have “a common understanding” on claim construction, i.e., that inputs must be set based on procedure type. PO Resp. 33–34. We disagree. Petitioner’s position on claim construction has never required inputs set based on procedure type. *See* Pet. 31; Reply 3. Furthermore, Petitioner’s proposed construction and its explanation of the prior art are largely separate issues, especially where, as here, the specific terminology in dispute (i.e., the phrases “for the 4-step . . . for the 2-step”) is not in the prior art. Instead, the prior art uses language (i.e., “correspond”) that Patent Owner seeks to read into the claims. *See* Tr. 18:15–20; 48:15–49:5; Ex. 1006 ¶¶ 59–60.

Based on the forgoing, we determine that the claim does not require that inputs correspond to or are set based upon procedure type such that for all 4-step procedures, the input is “0,” and for all 2-step procedures, the input is “1.” Similarly, we determine that “for the 4-step . . . procedure” should not be interpreted as “for all 4-step procedures,” and likewise, “for

the 2-step . . . procedure” should not be interpreted as “for all 2-step procedures.”

Based on this interpretation, the claim permits, for example, additional 4-step procedures having inputs other than “0” and additional 2-step procedures having inputs other than “1.”

Aside from that discussed above, no other express claim construction analysis is necessary for our decision 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.* ¶¶ 32, 122–23; Fig. 8.

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

[Fig. 9]

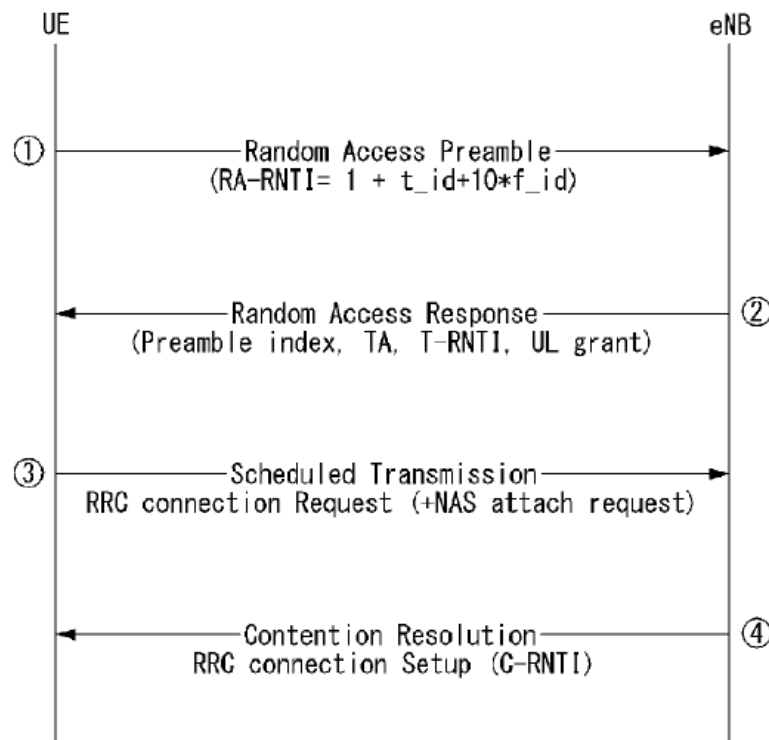


Figure 9, above, describes that the random access procedure may include four steps: 1) a step in which the terminal (UE) transmits a random access preamble to the base station (eNB), 2) a step in which a random access response is received from the base station, 3) a step in which an uplink message (scheduled 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

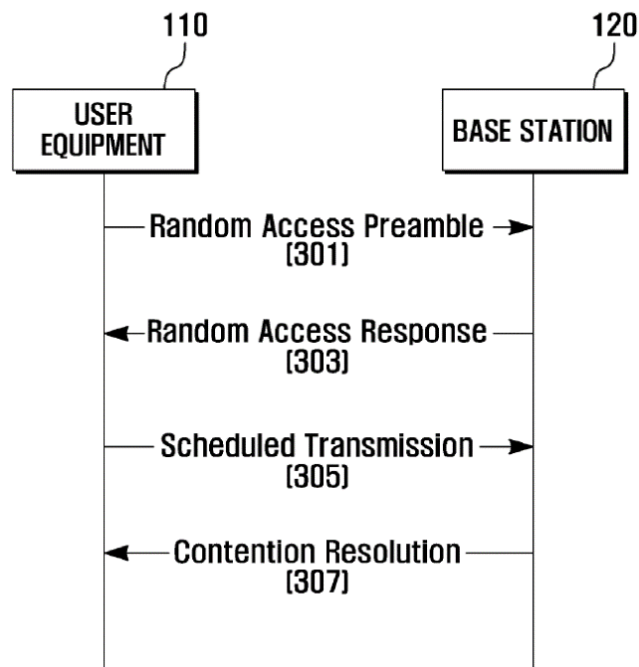


Figure 3, above, describes a 4-step procedure in which user equipment 110, in the first step, transmits random access preamble 301 to base station 120. Ex. 1006 ¶ 45. The base station then transmits random access response 303, the user equipment then transmits scheduled transmission 305, and the base 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_Initial_Power_n) and ramping power (Ramping_Power_n). Ex. 1006 ¶¶ 30, 59. Preamble_Initial_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) (“*KSR*”). 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 by a preponderance of the evidence that claim 4 is rendered obvious over Lee1 and Lee2 (“Lee1–Lee2”).

(a) Disputed Limitations 4d and 4e: 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.

As discussed above, we construed these limitations as requiring four elements (i.e., `preambleInitialReceivedTargetPower(0)`, `preambleInitialReceivedTargetPower(1)`, `powerRampingStep(0)`, and `powerRampingStep(1)`), which are functions of inputs “0” or “1”. *See* Section III.B.1 above. However, we do not construe these limitations as requiring that the inputs are set based on procedure type. *See* Section III.B.2 above.

Petitioner identifies Lee1’s 4-step contention based random access procedure, where `PREAMBLE_RECEIVED_TARGET_POWER` is given by `preambleInitialReceivedTargetPower` and `powerRampingStep` values (“the power 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 have been obvious extend it 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 settings or “power control parameters” (i.e., initial power and ramping power functions) for different types of random access (i.e., events such as idle to connected mode transition, RRC connection re-establishment, handover, and DL/UL data resume). Pet. 40; *see also id.* at 40–42 (citing Ex. 1006 ¶¶ 28–32, 45, 48–51, 59–60, 109). Different inputs correspond to different types of random access. *Id.* at 41.

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.* (“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) (third alteration in original)). Petitioner contends that “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. Petitioner explains,

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.”). For example, to further reduce the time delay associated with 2-step random access procedure, a POSITA would have found it obvious to use a larger initial transmission power (*i.e.*, “preambleInitialReceivedTargetPower(1)”) and/or power ramping step (*i.e.*, “powerRampingStep(1)”) for preambles transmitted as part of a 2-step random access procedure than those transmitted as part of a 4-step random access procedure. This approach naturally follows from Lee1’s disclosure that the goal of the 2-step random access procedure is to facilitate low latency communications by completing random access in as little time as possible.

Id. at 42 (citing Ex. 1003 ¶¶ 59, 88–89; Ex. 1005 ¶¶ 6, 19, 313; Ex. 1006 ¶ 109).

Thus, Petitioner’s position is that it would have been obvious to modify Lee1’s 2-step procedure (which prioritizes reducing latency) by adding Lee2’s higher power settings, thus resulting in further reduced latency. *See* Tr. 26:14–18 (“the modification would be to use the elevated power ramping parameters disclosed in Lee2 with the 2-step random access procedure disclosed in Lee1 . . . [but] for the 4-step random access procedure, no modification is required whatsoever.”).

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

As laid out in our Institution Decision, Lee1–Lee2 teaches limitations 4d/4d according to the Board’s claim construction, in which we do not interpret limitations 4d/4e as requiring that inputs correspond to (i.e., be set based on) procedure type. *See* Inst. Dec. 26–27. We stated,

[C]laim 4 does not actually require initial power and power ramping correspond to or be *dependent on procedure type*. . . . 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 [C]ombining 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*=[1], 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”).

Id. (third alteration in original). Thus, combining Lee1 and Lee2 results in a 4-step procedure with power settings (initial power and ramping power functions) set in accordance for a handover event, and a 2-step procedure having different power settings set in accordance for an RCC connection re-establishment event.

Under the construction of limitations 4d/4e set forth in our Institute Decision, and above in Section III.B.2, Patent Owner does not dispute that there is motivation to combine Lee1 and Lee2 or that the Lee1–Lee2 combination teaches or suggests limitations 4d/4e. *See* Tr. 34:13–19 (“[if] you set it based on something other than the procedure and you have two different values there's the 2 and 4. Yes, I think Petitioners are correct. If that's the way the Board reads these limitations, then the argument that . . . we present in our proceedings doesn't hold.”).

Regarding Patent Owner’s argument that “the Board has created an argument Petitioner never raised based upon a claim construction not put forth by either Party” contrary to the *inter partes* review adversarial framework (PO Resp. 47, 49 (citing Inst. Dec. 13, 16)), “the Board is not bound to adopt either party’s preferred articulated construction of a disputed claim term.” *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1328 (Fed. Cir. 2018). It was Patent Owner, not the Board, who raised the issue of whether limitations 4d and 4e require that inputs be set based on procedure type. *See* Prelim. Resp. 35; PO Resp. 30.

Based on the forgoing, we are persuaded by a preponderance of the evidence that there is sufficient motivation for the Lee1–Lee2 combination, and that the combination teaches or suggests limitations 4d and 4e.

We further add that, even under Patent Owner’s narrower interpretation, we disagree with Patent Owner’s argument that there is no motivation to combine Lee1 and Lee2 to arrive at different power settings based on procedure type. PO Resp. 37–42.

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*, 550 U.S. at 418. Because the prior art need not explicitly disclose or explicitly suggest the proposed modification (i.e., power settings based on procedure type), the absence of precise teachings regarding the proposed modification does not undermine the grounds of unpatentability.

Here, Lee1 teaches using the same power settings (initial power and ramping) for both 4-step and 2-step procedures. Ex. 1003 ¶¶ 71–72;

Ex. 1005 ¶ 152; Tr. 41:26–42:1 (acknowledging Lee1’s 4-step and 2-step use the same initial power); Inst. Dec. 21–22 (finding Lee1’s 4-step and 2-step procedure use the same ramping). Lee1 also teaches that the 2-step procedure reduces latency by having less steps. Ex. 1005 ¶¶ 6, 249.

Lee2 teaches different power settings depending on the circumstances. Ex. 1003 ¶ 89; Ex. 1006 ¶¶ 63, 71–74, 109. Lee2 teaches that using higher initial power and different ramping reduces latency. Ex. 1003 ¶ 88; Ex. 1006 ¶¶ 39 (high transmission power increases probability that the transmission will reach the base station), 45; Reply 14 (citing Ex. 1003 ¶ 46); PO Resp. 41.

With these teachings in mind, we are persuaded by Petitioner that incorporating Lee2’s higher power and different ramping into Lee1’s 2-step procedure would have even further reduced the latency of Lee1’s 2-step procedure, and that this would have resulted in different power settings based on procedure type. Pet. 37–38; Ex. 1003 ¶¶ 88–89; Reply 12–13. Patent Owner does not meaningfully dispute this point. *See generally* PO Resp. 37–42; Sur-reply 12–17.

Instead, Patent Owner argues that Lee1’s 4-step procedure would “equally benefit” from reducing latency, and that Petitioner has not explained why a POSITA would not use the same power settings for both procedures, i.e., use Lee2’s same higher power and different ramping in Lee1’s 4-step procedure. *See* PO Resp. 41–42. However, Petitioner’s burden is to provide a motivation for the *proposed* combination—in this case, modifying Lee1’s 2-step procedure with Lee2’s higher power and lower ramping. The obviousness analysis does not require Petitioner to

explain why the references would not have been combined in an alternative way not proposed by Petitioner.

To the extent Patent Owner argues that Lee1 and Lee2 cannot be combined as proposed, and therefore must be combined in this alternative manner, we disagree. For example, Patent Owner does not provide evidence of teaching away or that the proposed combination is inoperable. *See generally* PO Resp. 37–42; Sur-reply 12–17. Furthermore, we do not see how solving any technical issues in combining Lee1 and Lee2 as proposed would have been beyond the level of ordinary skill in the art. *See KSR*, 550 U.S. at 418.

Furthermore, Petitioner explains why a POSITA would have sought to modify only the 2-step procedure—because the 2-step is more concerned with reducing latency than the 4-step. Pet. 37–38; Ex. 1003 ¶¶ 88–89. Indeed, the implication of performing the conventional 4-step instead of the 2-step (again, the 2-step reduces latency due to having fewer steps) is that latency is not the overriding consideration in the 4-step procedure. As Petitioner explains, this is relevant because there are tradeoffs involved with using higher power, specifically, favorably reducing latency but unfavorably increasing the likelihood of interference. Reply 14 (citing Ex. 1003 ¶¶ 46–49). Petitioner further explains that POSITA would have recognized that using higher power (thereby reducing latency but increasing interference) may not have been desirable in certain circumstances. *Id.* at 13–14. Thus, it seems reasonable that a POSITA would seek to modify only the 2-step with higher power to even further reduce latency but leave intact the conventional 4-step, which is less concerned with latency. After all, “[a] person of

ordinary skill is also a person of ordinary creativity, not an automaton.”
KSR, 550 U.S. at 421.

In summary, we are persuaded that Lee1–Lee2 teaches or suggests limitations 4d and 4e, and that Petitioner provides a sufficient motivation to combine Lee1 and Lee2 to arrive at the claimed invention, for the reasons discussed above.

(c) Undisputed Limitations 4pre–4c

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, 225–29, 249, 315–16, 386–87, 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, 152–53, 249, 317, 386–87, 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).

Patent Owner does not specifically contest Petitioner’s contentions with respect to limitations 4pre–4c (*see generally* PO 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, by a preponderance of the evidence, that Lee1–Lee2 renders claim 4 is unpatentable.

2. *Claims 5 and 6*

Claim 5 recites, “wherein the preambleInitialReceivedTargetPower(0) and the preambleInitialReceivedTargetPower(1) and the powerRampingStep(0) and the powerRampingStep(1) are given by radio resource control information. Ex. 1001, 36:63–67. Petitioner identifies Lee1’s “Radio Resource Control (RRC) layer” and “system information.” Pet. 32–33 (citing Ex. 1003 ¶¶ 78–81; Ex. 1005 ¶¶ 73, 152), 43.

Claim 6 recites, “wherein the powerRampingStep(0) is a step size for power ramping up for the PREAMBLE RECEIVED TARGET POWER for the 4-step contention based random access procedure, and the powerRampingStep(1) is a step size for power ramping up for the PREAMBLE RECEIVED TARGET POWER for the 2-step contention based random access procedure.” Ex. 1001, 37:1–9. Petitioner identifies Lee1’s “powerRampingStep . . . which a POSITA would understand is ‘a step size for power ramping up.’” Pet. 34–35 (citing Ex. 1003 ¶¶ 69–77, 83; Ex. 1005 ¶ 152), 43–44. Petitioner also identifies Lee2’s “power ramping Ramping_Power_n.” *Id.* at 43–44 (citing Ex. 1006 ¶¶ 32, 48).

Patent Owner does not specifically contest Petitioner’s arguments with respect to claims 5 and 6. *See generally* PO. Resp. We are persuaded that Lee1–Lee2 teaches these limitations, for the reasons given by Petitioner. Pet. 32–36. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claims 5 and 6 are unpatentable.

1. Claim 8

Claim 8 is directed to a related method. Ex. 1001, 38:5–25. Petitioner relies on the same arguments presented for claim 4. Pet. 36 (citing Ex. 1003 ¶¶ 84–85) (stating “there is no material difference between the limitations of Claim 8 and those of Claim 4.”). Patent Owner does not contest this. *See generally* PO Resp.

For similar reasons as those discussed above with respect to claim 4, we determine that Petitioner has shown by a preponderance of the evidence that claim 8 is unpatentable.

F. ANTICIPATION BY OR OBVIOUSNESS OVER LEE1

Petitioner contends that claims 4–6 and 8 are unpatentable under § 102 by or § 103 as obvious over Lee1. Pet. 17–36.

Petitioner’s arguments with respect to Lee1 are premised on Petitioner’s initial incorrect claim construction, e.g., that independent claim 4’s limitations 4d/4e only require two elements (i.e., a common preambleInitialReceivedTargetPower value and a common powerRampingStep value). Pet. 31.

Petitioner now abandons its initial claim construction position and acknowledges that limitations 4d/4e require four elements, (i.e., power functions each having two inputs). Reply 3 (citing Inst. Dec. 13). Petitioner does not contend that Lee1 discloses or suggests these required four elements. *See* Pet. 17–36; Reply 3. Accordingly, we determine that Petitioner has not shown by a preponderance of the evidence that claim 4, as well as claims 5 and 6 depending therefrom, are unpatentable as anticipated by or obvious over Lee1.

Independent claim 8 recites similar limitations, and for the similar reasons, we determine that Petitioner has not shown by a preponderance of the evidence that claim 8 is unpatentable as anticipated by or obvious over Lee1.

IV. CONCLUSION

We conclude that Petitioner has shown that claims 4–6 and 8 of the ’207 patent are unpatentable by a preponderance of the evidence.

In summary:

Claims	35 U.S.C. §	Refer- ence(s)/Basis	Claims Shown Un- patentable	Claims Not Shown Un- patentable
4–6, 8	102(a)(1)–(2)	Lee1		4–6, 8
4–6, 8	103	Lee1		4–6, 8
4–6, 8	103	Lee1, Lee2	4–6, 8	
Overall Out- come			4–6, 8	

V. ORDER

It is:

ORDERED that Petitioner has shown that claims 4–6 and 8 of the '207 patent are unpatentable; and

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

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Patent 10,932,207 B2

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