

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

LBT IP I LLC,
Patent Owner.

IPR2020-01189
Patent 8,497,774 B2

Before JOHN A. HUDALLA, SHEILA F. McSHANE, and
JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

HUDALLA, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Denying Patent Owner's Motion to Amend
35 U.S.C. § 318(a)

Apple Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1, 4–6, 8, 10, 13, and 15 ("the challenged claims") of U.S. Patent No. 8,497,774 B2 (Ex. 1001, "the '774 patent"). LBT IP I LLC ("Patent Owner") filed a Preliminary Response (Paper 8, "Prelim. Resp."). Taking into account the arguments presented in Patent

Owner's Preliminary Response, we determined that the information presented in the Petition established that there was a reasonable likelihood that Petitioner would prevail with respect to its unpatentability challenges. Pursuant to 35 U.S.C. § 314, we instituted this proceeding on March 4, 2021, as to all challenged claims and all grounds of unpatentability. Paper 9 ("Dec. on Inst.").

During the course of trial, Patent Owner filed a Patent Owner Response (Paper 17, "PO Resp."), and Petitioner filed a Reply to the Patent Owner Response (Paper 25, "Pet. Reply"). Patent Owner also filed a Sur-reply. Paper 31 ("PO Sur-reply").

In addition, Patent Owner filed a contingent motion to amend (Paper 16, "MTA") proposing to substitute claims 20, 23–25, 27, 29, 32, and 34¹ for claims 1, 4–6, 8, 10, 13, and 15, respectively, if we are to determine claims 1, 4–6, 8, 10, 13, and 15 unpatentable. Petitioner filed an opposition to the motion to amend. Paper 26 ("MTA Opp."). On September 24, 2021, pursuant to Patent Owner's request (*see* MTA 2), we issued Preliminary Guidance on Patent Owner's motion to amend. Paper 28 ("PG"). Patent Owner then filed a reply in support of its motion to amend (Paper 30 ("MTA Reply")), to which Petitioner filed a sur-reply (Paper 36 ("MTA Sur-reply")).

An oral hearing was held on December 8, 2021, and a transcript of the hearing is included in the record. Paper 38 ("Tr.").

Petitioner filed Declarations of Scott Andrews with its Petition (Ex. 1003) and with its Reply and opposition to the motion to amend

¹ *See infra* § III.B.2.

(Ex. 1077). Both parties filed a transcript of the deposition of Mr. Andrews. Exs. 1068, 2003.

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1, 4–6, 8, 10, 13, and 15 of the '774 patent. For the reasons discussed below, Petitioner has demonstrated by a preponderance of the evidence that claims 1, 4–6, 8, 10, 13, and 15 of the '774 patent are unpatentable. We also *deny* Patent Owner's motion to amend.

I. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies Apple Inc. as the real party-in-interest. Pet. 72. Patent Owner identifies LBT IP I LLC as the real party-in-interest. Paper 3, 2; Paper 6, 2.

B. *Related Proceedings*

The parties identify the following proceedings related to the '774 patent (Pet. 72; Paper 3, 2; Paper 6, 2):

LBT IP I LLC v. Apple Inc., No. 1:19-cv-01245-UNA (D. Del. filed July 1, 2019); and

IPR2020-01190, IPR2020-01191, IPR2020-01192, and IPR2020-01193, in which Petitioner challenges other patents owned by Patent Owner. We issue final written decisions in IPR2020-01190, IPR2020-01191, IPR2020-01192, and IPR2020-01193 concurrently with this Decision.

C. The '774 patent

The '774 patent is directed to location and tracking communication systems. Ex. 1001, 1:33–34. Figure 1 of the '774 patent is reproduced below.

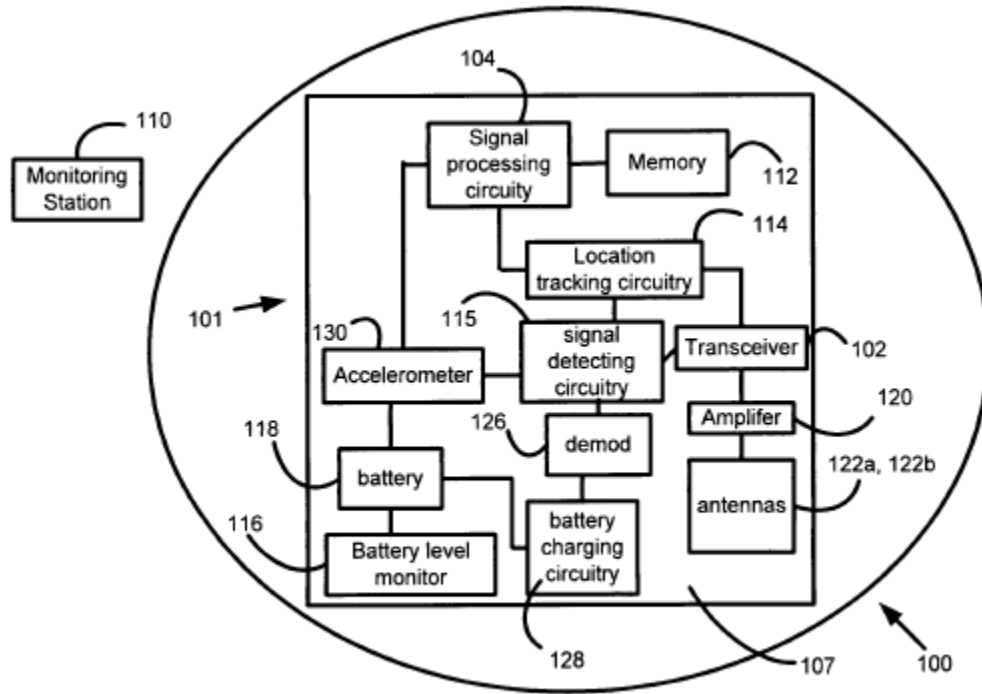


Figure 1

Figure 1 depicts a schematic of tracking device 100, which contains electronic components 101 such as transceiver 102, signal processing circuitry 104 (e.g., a microprocessor or other signal logic circuitry), and accelerometer 130. *Id.* at 4:62–64, 6:54–57. Location tracking circuitry 114 (e.g., global positioning system (GPS) circuitry) calculates location data received and sends the data to signal processing circuitry 104. *Id.* at 7:17–19. Signal detecting circuitry 115 detects and measures signal power level. *Id.* at 7:22–23. Battery level monitor 116 detects a battery level of battery 118. *Id.* at 7:25–28.

Tracking device 100 periodically checks availability of a GPS signal by performing a GPS signal acquisition to determine if a receive communication signal is above a first signal level. *Id.* at 8:7–10. Location tracking circuitry 114 or transceiver 102 may be placed in a sleep or standby mode to conserve a battery level of battery 118. *Id.* at 8:4–8. Electronic tracking device 100 may resume GPS signal acquisition using GPS satellites when the acquired receive communication signal level is above the first signal level. *Id.* at 8:10–16.

Accelerometer 130 may also activate if a power level of the receive communication signal (e.g., GPS signal) is insufficient for processing. *Id.* at 10:47–49. In this case, processing unit 104 computes current location coordinates using acceleration measurements. *Id.* at 10:53–54. When the receive communication signal again becomes sufficient for processing, accelerometer 130 is deactivated and location tracking circuitry 114 is activated. *Id.* at 10:58–67. In this case, processing unit 104 resumes the calculation of location coordinates from the receive communication signal. *Id.*

Figure 4 of the '774 patent is reproduced below.

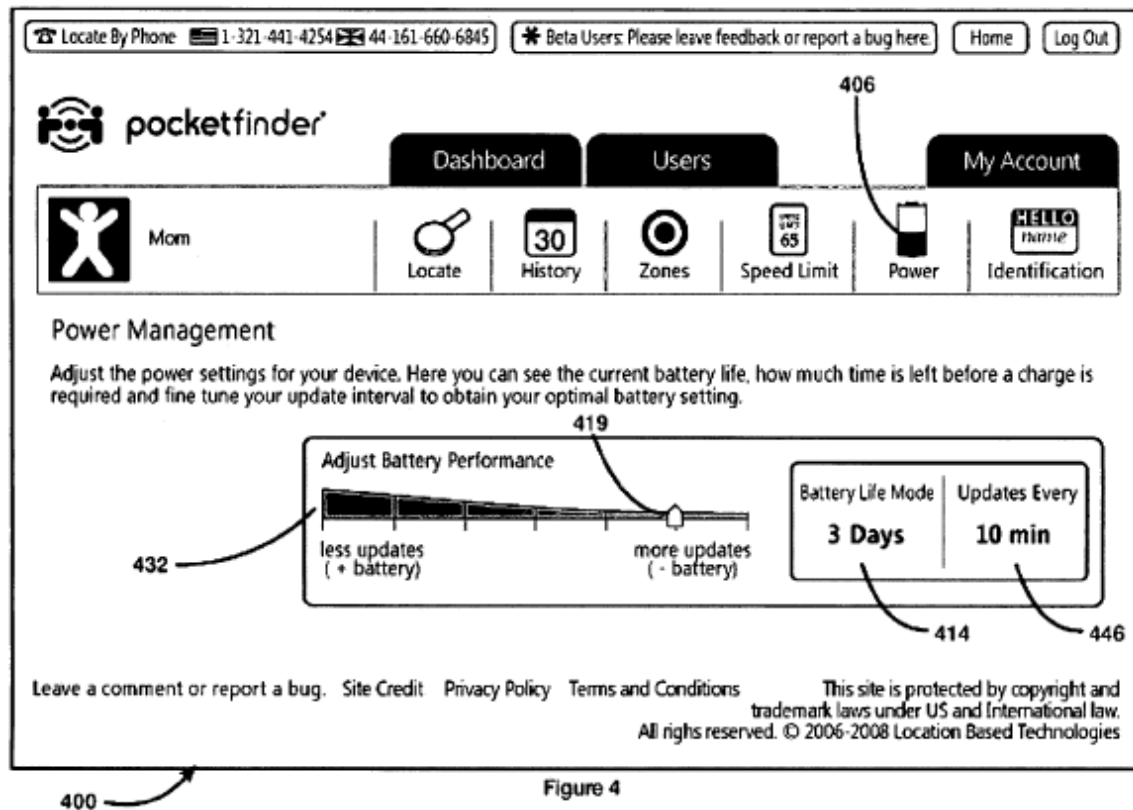


Figure 4, above, depicts screen display 400 of a personal communication device including a user definable adjustable power level monitor for an electronic tracking device. *Id.* at 5:5–7, 11:2–4, 11:12–17. Battery level monitor 116 measures in real-time battery charge level 406 of battery 118 and predicts estimated remaining battery charge life 414 in response to battery charge level 406. *Id.* at 11:22–25, 13:52–58. Battery level monitor 116 also adjusts the power level applied to location tracking circuitry 114 or transceiver 102 responsive to one or more signal levels. *Id.* at 13:52–58.

A local battery power adjustment mechanism generates in substantially real-time an updated set of network communication signaling protocols including, for example, update rate 446 (e.g., refresh rate) of

location coordinate packets. *Id.* at 11:31–36. Update rate 446 consists of a request rate of location coordinate packets by the target host and/or a listen rate of location coordinate packets by the portable electronic tracking device. *Id.* at 11:36–41. The local battery power adjustment mechanism includes user-adjustable slider 432² to graphically display in substantially real-time the trade-off relationships between remaining battery charge level 414 and update rate 446 of location coordinate packets. *Id.* at 11:53–57. The user may select a multitude of threshold values via slider 432 to intermittently activate or deactivate location tracking circuitry 114 in order to conserve the power of battery 118. *Id.* at 13:58–67. For example, the user may adjust slider 432 to choose a range of values between a lower update rate 446 (and less battery usage) and a higher update rate 446 (and more battery usage). *Id.* at 11:53–57, Fig. 4. This results in “an appropriate update[d] set of network communication signaling protocols to achieve a desired user defined battery operating environment, e.g., obtain optimal battery life, obtain optimal update rate, [and the] tradeoffs between them.” *Id.* at 11:58–63. This further may result in the local battery power adjustment mechanism communicating a message to activate or deactivate a portion of the transceiver circuitry, processor circuitry, or location tracking circuitry. *Id.* at 11:44–53.

The '774 patent issued from Application No. 12/419,451 (“the '451 application”) filed on April 7, 2009, which is a continuation-in-part of six applications. Ex. 1001, codes (21), (63). As discussed below, Petitioner

² Slider 432 is also called “user adjustable screen icon 432,” “on-line user adjustable cursor display 432,” and “active display 432” in the Specification of the '774 patent. *See, e.g.*, Ex. 1001, 11:53–57, 13:13–18, 13:58–67.

applies the April 5, 2007, filing date of two of these six applications (i.e., the earliest possible effective filing date) for qualifying the asserted references as prior art. *See* Pet. 3, 7–8.

D. Illustrative Claim

Of the challenged claims of the '774 patent, claims 1 and 8 are independent. Claims 4–6 depend directly or indirectly from claim 1, and claims 10, 13, and 15 depend from claim 8. Claim 1 is illustrative of the challenged claims and recites:

1. A portable electronic tracking device to monitor location coordinates of one or more individuals and objects using a satellite navigation system, the portable electronic tracking device comprising:

a battery having a battery charge level;

transceiver circuitry;

processor circuitry;

a battery power monitor to measure in real-time the battery charge level and to make a prediction of an estimated remaining battery charge level in response to the battery charge level;

local battery power adjustment mechanism to generate in substantially real-time an updated set of network communication signaling protocols associated with at least one of a request rate of location coordinate packets to be communicated to a target host and a listen rate of the location coordinate packets from a satellite navigation system, the updated set of network communication signaling protocols having a value that is responsive to a user input request;

wherein the local battery power adjustment mechanism activates or deactivates at least one portion of the transceiver

circuitry or the processor circuitry to conserve the battery charge level in response to the value.

Ex. 1001, 15:46–16:2.

E. Prior Art

Petitioner relies on the following prior art:

Japanese Unexamined Patent Application Publication No. JP 2004-37116A, published Feb. 5, 2004 (Ex. 1004, “Sakamoto”);³

Applicants’ Admitted Prior Art (Ex. 1001, 11:22–30, “AAPA”);

U.S. Patent No. 5,845,142, filed Aug. 29, 1997, issued Dec. 1, 1998 (Ex. 1011, “Hayasaka”).

F. The Instituted Grounds

We instituted *inter partes* review of claims 1, 4–6, 8, 10, 13, and 15 of the ’774 patent on the following grounds (Dec. on Inst. 29), which are all the grounds presented in the Petition (Pet. 6):

Claims Challenged	35 U.S.C. §	References/Basis
1, 4–6, 8, 10, 13, 15	103(a) ⁴	Sakamoto
1, 4–6, 8, 10, 13, 15	103(a)	Sakamoto, AAPA

³ Sakamoto is a Japanese-language publication (Ex. 1004, 36–49, 58) that was filed with an English-language translation (*id.* at 1–19, 21–34, 52–56) and declarations attesting to the accuracy of the translation (*id.* at 20, 50). Our citations to Sakamoto herein refer to the translation.

⁴ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102, 103, and 112. Because the ’774 patent was filed before March 16, 2013 (the effective date of the relevant amendments), the pre-AIA versions of §§ 102, 103, and 112 apply.

Claims Challenged	35 U.S.C. §	References/Basis
1, 4–6, 8, 10, 13, 15	103(a)	Sakamoto, Hayasaka

II. ANALYSIS

A. *Legal Standards*

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).

The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations.⁵ *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We also recognize that prior art references must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)).

B. *Level of Ordinary Skill in the Art*

Citing testimony from Mr. Andrews, Petitioner contends a person of ordinary skill in the art (or “POSITA”) “would have had a bachelor’s degree in Electrical Engineering, Computer Engineering, Computer Science, or an

⁵ The trial record does not include any evidence of secondary considerations of nonobviousness.

equivalent degree, with at least two years of experience in GPS navigation, portable tracking devices, or related technologies.” Pet. 3 (citing Ex. 1003 ¶¶ 29–30). For purposes of our Decision on Institution, we adopted Petitioner’s definition of the level of ordinary skill in the art without the qualifier “at least.” Dec. on Inst. 10. Patent Owner states that it adopts this definition. MTA 16. Thus, we discern no reason to change the level of ordinary skill in the art applied in this Final Written Decision. Accordingly, a person of ordinary skill in the art would have had a bachelor’s degree in Electrical Engineering, Computer Engineering, Computer Science, or an equivalent degree, with two years of experience in GPS navigation, portable tracking devices, or related technologies. We determine that this definition comports with the level of skill necessary to understand and implement the teachings of the ’774 patent and the asserted prior art.

C. Claim Interpretation

In an *inter partes* review, we construe each 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). Accordingly, our claim construction standard is the same as that of a district court. *See id.* Under the standard applied by district courts, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when

the patentee disavows the full scope of a claim term either in the specification or during prosecution.” *Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012).

1. “Multitude”

Claim 8 recites a “power level comprising a multitude of threshold values.” Ex. 1001, 16:56–57. In its obviousness analysis, Petitioner relies on Sakamoto for teaching two such threshold values. *See* Pet. 50–51. In the Preliminary Response, Patent Owner contended that Petitioner’s showing of two threshold values was not sufficient to teach the recited “multitude” of claim 8. Prelim. Resp. 16–17. We construed “multitude” to include two thresholds for purposes of our Decision on Institution, and we encouraged the parties to further address the interpretation of the term during trial. Dec. on Inst. 12.

In post-institution briefing, Patent Owner contends that “a multitude in the context of the ’774 Patent is necessarily more than two,” i.e., three or more. PO Resp. 12–17; PO Sur-reply 2–4. Petitioner asks us to maintain our construction that a “multitude” includes two. Pet. Reply 1–10. We now consider the parties’ arguments and the evidence of record pertaining to the construction of “multitude.”

At the outset, we note that an exemplary embodiment in Figure 4 of the ’774 patent depicts 5–7 thresholds. *See* Ex. 1001, 13:58–67, Fig. 4 (432). In our Decision on Institution, we found that these 5 or 7 thresholds are not a benchmark for what constitutes a “multitude” in claim 8. Dec. on Inst. 11 (citing *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014)). During the course of trial, both parties acknowledged the

exemplary embodiment in Figure 4 (PO Resp. 16; Pet. Reply 8; PO Sur-reply 5–7), but neither party contends that the 5–7 thresholds depicted therein should limit our interpretation of “multitude.” Thus, we maintain our determination from the Decision on Institution that the embodiment of Figure 4 with 5–7 thresholds constitutes a non-limiting example.

Patent Owner contends that another portion of the Specification of the ’774 patent supports an interpretation of “multitude” as being three or more. PO Sur-reply 6–7. Specifically, Patent Owner cites the following passage: “Advantageously as compared to conventional tracking devices, user input request 430 adjusts value 419 to select an appropriate update set of network communication signaling protocols to achieve a desired user defined battery operating environment, e.g., *obtain optimal battery life, obtain optimal update rate, tradeoffs between them.*” *Id.* (quoting Ex. 1001, 11:58–67) (emphasis added). Patent Owner contends this language “clearly discloses that a threshold value may be any value along a line between two end points, including the end points (*i.e.*, ‘obtain optimal battery life’ as one end point, ‘obtain optimal update rate’ as another end point, and ‘tradeoffs between them’ as any value along the line).” *Id.* at 7. At oral argument, Patent Owner also emphasized that the plural “tradeoffs” supported its interpretation, because values between the endpoints allegedly represent tradeoffs. *See* Tr. 29:20–32:13. Thus, Patent Owner interprets “the number of available values” as being “at least three (*i.e.*, each end point and the value depicted as 419).” *Id.* Petitioner disputes Patent Owner’s position because “the ’774 Specification establishes, at best, only 5–7 thresholds.” Pet. Reply 8.

We do not agree with Patent Owner that the Specification's statement about tradeoffs between "optimal battery life" and "optimal update rate" necessarily requires a spectrum of at least three threshold values (i.e., two endpoints and at least one value between them). If anything, this statement supports the view that such tradeoffs can be made between as few as two points: an endpoint where less updates are traded for better battery life, and an endpoint where worse battery life is traded for more updates. *See* Ex. 1001, Fig. 4 (slider 432). We also do not ascribe any significance to the plural "tradeoffs" in Patent Owner's cited statement, because every point in such a spectrum would involve its own tradeoffs between battery life and update frequency. Thus, we agree with Petitioner that the Specification does not support Patent Owner's interpretation of a multitude as necessarily being three or more. We also consider the Specification's statement about "obtain[ing] optimal battery life, obtain[ing] optimal update rate, [and the] tradeoffs between them" (Ex. 1001, 11:58–63) to at least be consistent with the notion that "multitude" means two or more in the context of the '774 patent.

Patent Owner also contends that the prosecution history of the application that issued as the '774 patent supports an interpretation of "multitude" as being three or more. Specifically, Patent Owner cites the patentees' amendment of claim 8,⁶ which Patent Owner alleges was made to overcome a rejection of the claim based on U.S. Patent No. 7,826,968 (Ex. 2011, "Huang"). PO Resp. 14 (citing Ex. 1002, 270, 297–98). Patent Owner further contends that Huang discloses "two preset speed-of-

⁶ Prosecution claim 8 issued as claim 8 in the '774 patent, so we refer to it simply as "claim 8."

movement thresholds for adjusting the frequency of positioning updates.”⁷ *Id.* at 14–16 (citing Ex. 2011, 2:43–52, 2:55–3:8). According to Patent Owner, the patentees made the amendment “in order to overcome prior art that disclosed two thresholds,” so “the amendment is intrinsic evidence of the patentee[s]’ clear intent to define ‘multitude’ as more than two.” *Id.* at 16; *see also* PO Sur-reply 3–4 (same argument).

Petitioner notes that the patentees amended claim 8 to include the limitations of prosecution claim 17, which the patent examiner indicated was allowable. Pet. Reply 3–4 (citing Ex. 1002, 297–99). Petitioner argues that the added language from prosecution claim 17 “includes at least four distinct limitations: (1) a multitude of thresholds; (2) determined by a user or system administrator; (3) to intermittently activate or deactivate the location tracking circuitry to conserve power of the charging unit; and (4) in response to the estimated charge level of the charging unit.” *Id.* Petitioner further notes that the patentees “did not present any substantive arguments distinguishing this amendment over Huang, but only relied on the Examiner’s indication that claim 17 was allowable.” *Id.* at 4. For these reasons, Petitioner contends that “any alleged prosecution disclaimer is ‘ambiguous, or even amenable to multiple reasonable interpretations.’” *Id.* at 3, 6–7 (quoting *Avid Tech., Inc. v. Harmonic, Inc.*, 812 F.3d 1040, 1045 (Fed. Cir. 2016)).

We agree with Petitioner. First, the patentees added the limitations of prosecution claim 17 (and intervening prosecution claim 16) after the patent

⁷ Petitioner disputes that Huang teaches only two thresholds. Pet. Reply 5–6. We need not resolve this dispute because we dispose of the instant prosecution history argument based on other grounds.

examiner objected to prosecution claim 17 “as being dependent upon a rejected base claim, but . . . allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.” Ex. 1002, 271–72. The patentees’ amendment rewrote prosecution claim 17 in independent form, which included base claim 8. *Id.* at 292–94, 297–98. The patentees made no arguments relative to the previous rejection of claim 8 (based on Huang), at which time claim 8 did not include the additional limitations of prosecution claims 16 and 17. *See id.* This undermines Patent Owner’s suggestion that the amendment was made to overcome Huang. Second, we agree with Petitioner that, even if we were to consider the amendment of claim 8 to be responsive to the Huang rejection, the patentees’ addition of multiple different limitations to claim 8 (Ex. 1002, 297; Pet. Reply 3) does not make it “clear and unmistakable” that the amendment was directed to and disclaimed devices with two thresholds. *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1325 (Fed. Cir. 2013). Thus, we do not find Patent Owner’s cited prosecution history supports a construction of “multitude” as being three or more.

Patent Owner additionally argues that we should rely on evidence of the plain and ordinary meaning of “multitude” from contemporaneous dictionaries only in the sense that it means “a large number or amount.” PO Resp. 17 (citing Ex. 3001, 4; Ex. 3002, 4). As such, Petitioner cites “synonyms for ‘multitude’ [that] include ‘host,’ ‘legion,’ and ‘army,’ all of which ‘denote a very great number of people or things.’” *Id.* (citing Ex. 3001, 3). Petitioner contends that we should interpret “multitude” as synonymous with “plurality” based on “substantially identical dictionary definitions for the two terms and one dictionary that defined ‘plurality’ as

‘multitude.’” Pet. Reply 1 (citing Dec. on Inst. 11–12). Petitioner also contends that none of the dictionary definitions in evidence “is consistent with drawing a line between two and three, or with drawing a line between two and ‘between five and seven.’” *Id.* at 9.

In our Decision on Institution, we stated “that one dictionary . . . defines ‘plurality’ as ‘a multitude,’” which supports a construction of “multitude” as “at least two” in accordance with universally applied patent practice. Dec. on Inst. 12 (citing Ex. 3001, 4; *SIMO Holdings Inc. v. Hong Kong uCloudlink Network Tech. Ltd.*, 983 F.3d 1367, 1377 (Fed. Cir. 2021)). Patent Owner asks us to instead focus on definitions of multitude as being “a large number or amount.” PO Resp. 17. We note, however, that such definitions are inconsistent with Patent Owner’s position that a multitude of thresholds could encompass as few as three thresholds. In other words, we do not agree that three is consistent with a “host,” “legion,” “army,” or “a very great number of people or things.” Ex. 3001, 3. Nor has Patent Owner put forth evidence suggesting that two must be excluded from what is considered a multitude. Given the breadth of dictionary definitions in evidence, we find that this extrinsic evidence does not support limiting the definition of “multitude” to three or more as suggested by Patent Owner. Instead, we find that the breadth of the dictionary definitions in evidence supports our initial construction that “multitude” includes two. *See, e.g., id.*; Ex. 3002, 3.

Finally, we consider Patent Owner’s argument based on the patent law maxim “that claims should be construed to preserve their validity.” *Phillips* 415 F.3d at 1327; *see also* PO Sur-reply 3, 5 (citing same). Specifically, Patent Owner makes the following argument:

Since a claim term must be construed in a way that preserves validity and Petitioner asserts that a construction of “multitude” as a number that is less than five lacks written description support, the only proper interpretation of “multitude” is “a number that is necessarily more than two”, which also encompasses a number larger than four.

PO Sur-reply 6.

We do not agree with Patent Owner’s argument. *Phillips* is clear that the “preserving validity” maxim is limited “to cases in which the [Board] concludes, after applying all the available tools of claim construction, that the claim is still ambiguous.” *Phillips*, 415 F.3d at 1327 (internal quotation omitted). At the oral hearing, Patent Owner conceded that “multitude” was not ambiguous; rather, Patent Owner only sought to invoke the maxim to the extent that we might agree with Petitioner’s claim construction arguments. Tr. 29:1–19. This undermines any suggestion that the term is ambiguous. Thus, just like the court in *Phillips*, we can construe “multitude” “without the need to consider whether one possible construction would render the claim invalid while the other would not.” *Phillips*, 415 F.3d at 1328.

Having considered all the evidence of record, we discern no reason to change our initial determination that a “multitude” may include two. Thus, we maintain our determination from the Decision on Institution that a “multitude” includes two (as opposed to being no fewer than three). This construction is consistent with the counsel of our reviewing court that “it seems unlikely that a claim drafter would use a term of such biblical imprecision as ‘multitude’ if that term were meant to have an important restrictive function in the claim.” *TiVo, Inc. v. EchoStar Commc’ns Corp.*, 516 F.3d 1290, 1297 (Fed. Cir. 2008).

2. *Other Terms*

We determine that no other terms require explicit construction. *See, e.g., Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. *Obviousness Ground Based on Sakamoto*

Petitioner contends the subject matter of claims 1, 4–6, 8, 10, 13, and 15 would have been obvious over Sakamoto. Pet. 8–55; Pet. Reply 10–19. Patent Owner disputes Petitioner’s contentions. PO Resp. 4–17; PO Sur-reply 8–14.

1. *Sakamoto*

Sakamoto is a Japanese patent application publication directed to the use of a GPS positioning system that includes a portable terminal and remote server. Ex. 1004, code (57), ¶ 18. Figure 1, reproduced below, is a diagram showing a position information communication terminal.

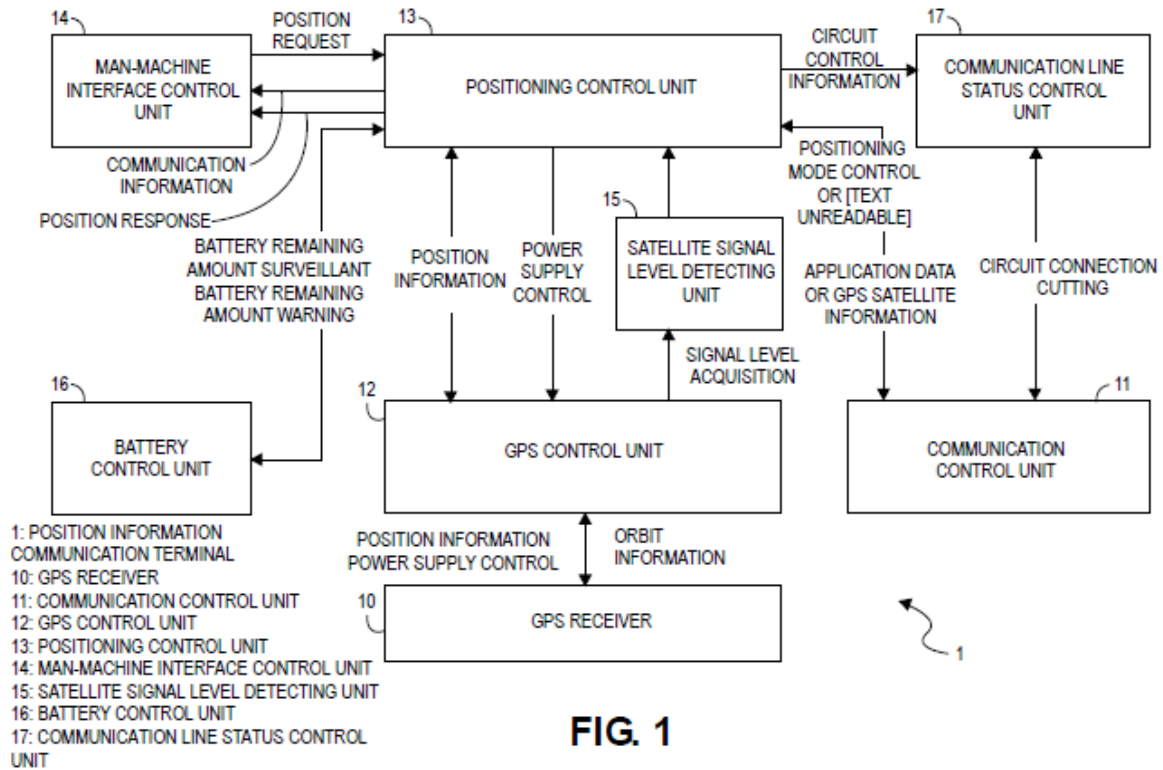


FIG. 1

Figure 1, above, depicts position information communication terminal 1, which includes GPS receiver 10, communication control unit 11 for mobile communications, GPS control unit 12, positioning control unit 13, man-machine interface control unit 14, satellite signal level detection unit 15, battery control unit 16, and communication line status control unit 17. *Id.* ¶ 19. Battery control unit 16 constantly monitors the remaining battery level. *Id.* ¶ 28. Battery control unit 16 provides positioning control unit 13 a remaining battery life warning when the remaining battery amount falls below a preset threshold value. *Id.* ¶ 19.

Satellite signal level detector 15 detects a level of the GPS signal received by GPS receiver 10 via GPS control unit 12. *Id.* When the signal level value is equal to or higher than a predetermined threshold value, positioning mode control unit 22 initiates a normal sensitivity positioning mode. *Id.* ¶ 38. Normal sensitivity positioning mode is a mode in which the

GPS receiver is operated only when necessary. *Id.* ¶¶ 4–5, 19. When the signal level value is equal to or lower than a predetermined threshold value, positioning mode control unit 22 initiates a high sensitivity positioning mode. *Id.* ¶ 38. High sensitivity positioning mode is a mode in which the GPS receiver is operated constantly. *Id.* ¶¶ 4–5, 19. When the signal level value is equal to or lower than a threshold value associated with the inability to perform positioning, positioning mode control unit 22 stops the position search. *Id.* ¶ 38. A user may select among normal sensitivity positioning mode, high sensitivity positioning mode, and the power-off of terminal 1 via man-machine interface control unit 14. *Id.* ¶¶ 26, 28.

Figure 2 of Sakamoto is reproduced below.

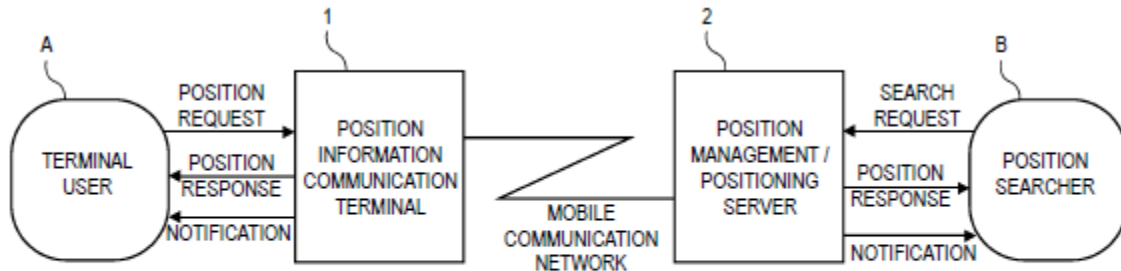


FIG. 2

Figure 2 depicts a GPS positioning system with position management/positioning server 2 connected to position information communication terminal 1 by a mobile communication network. Ex. 1004 ¶ 18. Terminal 1 responds to a position request from terminal user A by showing the position of terminal 1 to terminal user A. *Id.* Server 2 responds to a position search request of terminal 1 from position searcher B with a position response. *Id.* Server 2 may also send a position search request message to terminal 1, and terminal 1 responds by sending a search response message including position information to server 2. *See id.* ¶¶ 31–35, Figs. 4, 5.

Petitioner contends Sakamoto qualifies as prior art under 35 U.S.C. § 102(b) based on its publication date. Pet. 7. Patent Owner does not contest the prior art status of Sakamoto. We determine that Sakamoto qualifies as prior art under 35 U.S.C. § 102(b) because Sakamoto's publication date of February 5, 2004, is more than one year before the earliest effective filing date of the challenged claims, which is April 5, 2007. Ex. 1001, code (63); Ex. 1004, code (43).

2. *Claim 1*

The preamble of claim 1 recites “[a] portable electronic tracking device to monitor location coordinates of one or more individuals and objects using a satellite navigation system.” Ex. 1001, 15:46–48. Petitioner cites Sakamoto's position information communication terminal 1, which comprises GPS receiver 10, communication control unit 11, GPS control unit 12, position control unit 13, man-machine interface control unit 14, satellite signal level detecting unit 15, battery control unit 16 and battery, and communication line status controlling unit 17. Pet. 13 (citing Ex. 1004 ¶ 19, Fig. 1). Petitioner contends an ordinarily skilled artisan would have considered terminal 1 to be portable based on Sakamoto's teaching of using terminal 1 with a battery and a mobile communication network. *Id.* at 14–15 (citing Ex. 1003 ¶ 76; Ex. 1004 ¶¶ 3, 11, 14, 30, 31, 46). Regarding “monitor[ing] location coordinates of . . . individuals and objects using a satellite navigation system,” Petitioner cites Sakamoto's GPS receiver 10 and GPS control unit 12, which allegedly “determine terminal user A's (an individual's) and terminal 1's (an object's) position.” *Id.* at 15 (citing Ex. 1004 ¶¶ 18, 20–24, Fig. 2).

Patent Owner does not contest Petitioner’s analysis of the preamble. Neither party addresses whether the preamble is limiting. We are persuaded that Sakamoto teaches a “portable electronic tracking device to monitor location coordinates of one or more individuals and objects using a satellite navigation system a battery with a battery charge level.” *See, e.g.*, Ex. 1004 ¶¶ 3, 18–19. Because Petitioner has shown that Sakamoto teaches the preamble, we need not determine whether the preamble is limiting. *See Nidec*, 868 F.3d at 1017.

Claim 1 further recites “a battery having a battery charge level.” Ex. 1001, 15:50. Petitioner cites Sakamoto’s teachings of battery control unit 16 in terminal 1 that notifies “positioning control unit 13 of a remaining battery amount warning when the remaining amount value of a battery (not shown) that supplies operating power falls below a preset threshold value.” Pet. 16 (quoting Ex. 1004 ¶ 19) (emphasis omitted). Petitioner also notes Sakamoto’s reference that battery control unit 16 monitors “remaining battery level.” *Id.* at 17 (quoting Ex. 1004 ¶ 28) (emphasis omitted). Petitioner additionally notes that “*Sakamoto*’s claims include the battery in the of [sic] components of the terminal.” *Id.* at 16 (citing Ex. 1004 ¶¶ 9, 10, 14, 15). Patent Owner does not contest Petitioner’s analysis of this limitation. We are persuaded that Sakamoto teaches “a battery having a battery charge level.” *See, e.g.*, Ex. 1004 ¶¶ 9, 10, 14, 15, 19, 28.

Claim 1 further recites “transceiver circuitry.” Ex. 1001, 15:51. Petitioner cites, *inter alia*, Sakamoto’s teaching of “communication control unit 11” including “mobile communication means.” Pet. 18 (citing Ex. 1004 ¶¶ 19, 30). Petitioner further cites Sakamoto’s teachings that communications control unit 11 transmits positioning control messages and

remaining battery amount warning messages and receives positioning control messages. *Id.* (citing Ex. 1004 ¶¶ 7, 34, 35). In light of these teachings, Petitioner contends an ordinarily skilled artisan would have known Sakamoto's communication control unit 11 to be a transceiver. *Id.* (citing Ex. 1003 ¶ 80). Patent Owner does not contest Petitioner's analysis of this limitation. We are persuaded that Sakamoto teaches transceiver circuitry. *See, e.g.*, Ex. 1003 ¶ 80; Ex. 1004 ¶¶ 7, 34, 35.

Claim 1 further recites "processor circuitry." Ex. 1001, 15:52. Petitioner cites Sakamoto's teaching of GPS receiver 10 performing "positioning operations" when it determines location coordinates from a received communication signal. Pet. 20 (citing Ex. 1004 ¶ 19, Fig. 1). Petitioner further cites Sakamoto's teaching of satellite level detecting unit 15 detecting the level of the GPS satellite signal and performing calculations based on the received signal level. *Id.* at 21 (citing Ex. 1003 ¶ 83; Ex. 1004 ¶¶ 19, 37). Patent Owner does not contest Petitioner's analysis of this limitation. We are persuaded that Sakamoto teaches processor circuitry. *See, e.g.*, Ex. 1004 ¶¶ 19, 37.

Claim 1 further recites "a battery power monitor to measure in real-time the battery charge level and to make a prediction of an estimated remaining battery charge level in response to the battery charge level." Ex. 1001, 15:53–56. Petitioner again cites Sakamoto's battery control unit 16 and notes that it "constantly" monitors a remaining battery amount in order to determine when battery power falls below a predetermined threshold. Pet. 22–24 (citing Ex. 1004 ¶¶ 19, 28, 39). Petitioner further contends an ordinarily skilled artisan would have known that monitoring the remaining battery charge amount necessarily requires an estimate based on

“conditions such as temperature and battery age.” *Id.* at 24–25 (citing Ex. 1003 ¶ 85). Patent Owner does not contest Petitioner’s analysis of this limitation. We are persuaded that Sakamoto’s battery control unit 16 teaches the recited “battery power monitor.” *See, e.g.*, Ex. 1003 ¶ 85; Ex. 1004 ¶¶ 19, 28, 39.

Claim 1 further recites:

local battery power adjustment mechanism to generate in substantially real-time an updated set of network communication signaling protocols associated with at least one of a request rate of location coordinate packets to be communicated to a target host and a listen rate of the location coordinate packets from a satellite navigation system, the updated set of network communication signaling protocols having a value that is responsive to a user input request.

Ex. 1001, 15:57–65. For the recited “local battery power adjustment mechanism,” Petitioner cites Sakamoto’s man-machine interface control unit 14 and positioning control unit 13. Pet. 26–27 (citing Ex. 1004, Fig. 1). Petitioner contends these elements “act in concert to reduce (*i.e.*, ‘adjust’) the battery usage of *Sakamoto*’s terminal.” *Id.* at 27 (citing Ex. 1004 ¶ 46). Petitioner explains that a user sets a “preset threshold value” using man-machine interface control unit 14 “to specify the battery level below which the terminal will automatically switch from high sensitivity positioning mode to normal sensitivity positioning mode.” *Id.* at 27–28 (citing Ex. 1004 ¶¶ 29, 46). Based on this threshold value, positioning control unit 13 switches between the high sensitivity positioning mode and the normal sensitivity positioning mode by turning on and off the GPS receiver according to the current positioning mode. *Id.* at 28 (citing Ex. 1003 ¶ 87; Ex. 1004 ¶¶ 20, 24). Petitioner contends modes are changed “substantially [in] real-time” based on Sakamoto’s real-time battery monitoring and

Sakamoto's teaching of "automatically" switching modes at a preset threshold battery level. *Id.* at 29–30 (citing Ex. 1003 ¶ 88; Ex. 1004 ¶¶ 19, 29, 46). Petitioner further contends that an ordinarily skilled artisan "would have appreciated that switching the positioning mode updates the communication signaling protocol." *Id.* at 31 (citing Ex. 1003 ¶¶ 89–94); *see also id.* at 29–30 (same argument); Pet. Reply 15 (same argument).

Petitioner maps the recited "communication signal protocols" to Sakamoto's normal sensitivity positioning mode, high sensitivity positioning mode, and power-off mode. Pet. 31 (citing Ex. 1004 ¶¶ 5–10, 28). For the recited "listen rate," Petitioner notes that, after an initial position request, "high-sensitivity positioning mode keeps the GPS continuously powered on, 'constantly' updating the position of the terminal," so an ordinarily skilled artisan would have known the GPS receiver to have "an associated refresh rate of location coordinates (commonly 1Hz)." *Id.* (citing Ex. 1003 ¶ 90; Ex. 1004 ¶¶ 20, 25, 31, 36). Petitioner further notes that, in Sakamoto's normal sensitivity positioning mode, GPS receiver 10 is powered on and off in response to requests at man-machine interface control unit 14, which Petitioner characterizes as regular or irregular. *Id.* at 32–33 (citing Ex. 1003 ¶ 92; Ex. 1004 ¶¶ 24, 34). Petitioner additionally notes that Sakamoto discloses search requests made during a regular "short cycle." *Id.* at 33 (citing, *inter alia*, Ex. 1004 ¶ 40). Furthermore, Petitioner notes that even when no positioning request is pending, the server may periodically (i.e., at a "cycle set in advance") send a satellite signal level request message, which "causes the terminal to monitor the satellite signal level for a specified length of time and send a 'satellite signal level response message' with signal strength data to the server." *Id.* at 32 (citing Ex. 1004 ¶ 37). As such,

Petitioner contends an ordinarily skilled artisan would have understood that the periodic satellite signal request message cycle is “a minimum value for the listen rate of the GPS receiver in normal sensitivity position.” *Id.* (citing Ex. 1003 ¶ 92). Finally, Petitioner asserts that the listen rate for GPS signals is zero when the GPS receiver is in power-off mode. *Id.* at 33–34 (citing Ex. 1003 ¶ 94; Ex. 1004 ¶¶ 28, 39, 51).

For the “request rate,” Petitioner contends that search response messages in Sakamoto’s normal and high sensitivity modes “are generated in response to a position search request message and as such may be generated in response to a request by a position searcher or repeatedly in a ‘short cycle.’” Pet. 33 (citing Ex. 1004 ¶¶ 31–35, 40, 53). In light of this, Petitioner contends that an ordinarily skilled artisan “would have understood that the communication signaling protocol associated with normal sensitivity positioning mode has a response rate that may be irregular (based on manual searches) or regular (at a predefined cycle frequency).” *Id.* (citing Ex. 1003 ¶¶ 91–92). Petitioner also contends that an ordinarily skilled artisan would have known that the response rate for requests is zero in power-off mode “because GPS signal levels are not monitored and position searching is stopped.” *Id.* at 34 (citing Ex. 1003 ¶ 94; Ex. 1004 ¶ 38). Petitioner provides a chart, reproduced below, summarizing its “request rate” and “listen rate” mappings to Sakamoto’s teachings.

Communication signaling protocol	GPS Listen Rate	Response Rate (to Request Rate of Location Coordinate Packets)
High sensitivity positioning mode	Maximum GPS refresh rate (<i>e.g.</i> , 1Hz)	irregular request rate or regular “short cycle”
Normal sensitivity positioning mode	irregular request rate, regular “short cycle,” or “cycle set in advance”	irregular request rate or regular “short cycle”
Power-off mode	0Hz	0Hz

Id. In this chart from the Petition, Petitioner has listed its contentions regarding the “GPS Listen Rate” and “Response Rate (to Request Rate of Location Coordinate Packets)” for Sakamoto’s high and normal sensitivity modes and power-off mode. *Id.*

For the limitation that “the updated set of network communication signaling protocols hav[e] a value that is responsive to a user input request,” Petitioner cites Sakamoto’s teaching that “terminal user A can select the positioning mode (and therefore the value of the communication signaling protocol) using man-machine interface control unit 14.” Pet. 34–35 (citing Ex. 1004 ¶ 26). Petitioner contends the “value of the communication signaling protocol” is responsive to the user’s selection of either normal sensitivity positioning mode, high sensitivity positioning mode, or power-off mode. *Id.* at 35 (citing Ex. 1004 ¶ 28). Petitioner further contends that an ordinarily skilled artisan would have known the listen rate and response rate are “value[s]” associated with the communication signaling protocol. *Id.* at 36 (citing Ex. 1003 ¶¶ 92–93).

Patent Owner argues the “local battery power adjustment mechanism” limitation of claim 1 “is directed to updating a schedule of repeating events.”

PO Resp. 9. In support of its argument, Patent Owner contends that “the claimed ‘request rate’ and ‘listening rate’ of independent claims 1 and 8 are parameters of ‘cycle timing,’ (*i.e.*, scheduling).” *Id.* at 7 (quoting Ex. 1001, Abstr., 4:37–43). Patent Owner also cites embodiments of the ’774 patent where “the request rate of location coordinate packets to be communicated to a target host and the listen rate of the location coordinate packets from a satellite navigation system represent a schedule for when repeating activities occur.” *Id.* at 8 (citing Ex. 1001, 12:1–18); *see also id.* at 9 (citing examples from the ’774 patent related to request rate and listen rate schedules for tracking a dog, a car, and rented construction equipment). Patent Owner contrasts these disclosures from the ’774 patent with Petitioner’s cited teachings from Sakamoto insofar as “*Sakamoto* does not disclose a schedule of repeating events or any updating of such schedule.” *Id.* at 9–10.

We do not agree with Patent Owner’s arguments because they are not commensurate with the language of claim 1. In particular, claim 1 includes no requirement that the “updated set of network communication signaling protocols” must relate to schedules of repeating events or the updating of such schedules. *See* Ex. 1001, 15:57–65. “While we read claims in view of the specification, of which they are a part, we do not read limitations from the embodiments in the specification into the claims.” *Hill-Rom*, 755 F.3d at 1371. Thus, Patent Owner is wrong to suggest (*see* PO Resp. 7–9) that various exemplary embodiments from the Specification of the ’774 patent limit the recited “local battery power adjustment mechanism.”

Patent Owner acknowledges that “*Sakamoto* may disclose three positioning modes and three associated refresh rates,” but argues that “*Sakamoto* does not disclose ‘an updated set’ as a distinct element from the

three fixed refresh rates.” PO Sur-reply 9. Patent Owner also argues that “Petitioner does not show how any of these fixed refresh rates might be generated in substantially real-time.” *Id.* at 10. Patent Owner likewise argues that Petitioner has not shown how Sakamoto’s “fixed refresh rates” meet the “generated in substantially real time” limitation of claim 1. *Id.*

We do not agree with Patent Owner’s arguments. Petitioner relies on switching among Sakamoto’s positioning modes for teaching the updated sets. Pet. 31 (citing Ex. 1004 ¶¶ 5–10, 28). Mr. Andrews testifies that an ordinarily skilled artisan “would have appreciated that switching the positioning modes (responsive to a low-power condition or to user command) changes the frequency with which *Sakamoto*’s terminal transmits and receives data (*i.e.*, updates the communication signaling protocol of the terminal).” Ex. 1003 ¶ 89. Petitioner also explains how changing Sakamoto’s modes changes the associated listen rate and request rate. *See* Pet. 31–34. And, as acknowledged by Patent Owner at the oral hearing, the “updated set based on the claim language would include either/or both a refresh rate and a listen rate.” Tr. 39:17–18. Thus, Petitioner persuasively shows that Sakamoto teaches the recited “updated set of network communication signaling protocols.”

We also are persuaded that Sakamoto’s modes switch “in substantially real-time” based on Sakamoto’s teaching of an “automatic shift” from high sensitivity mode to normal mode based on the battery falling below a threshold and based on Sakamoto’s aim of reducing power consumption. Pet. 29–30 (quoting Ex. 1004 ¶¶ 29, 46); Ex. 1003 ¶ 88. Mr. Andrews testifies that an ordinarily skilled artisan “would have appreciated that switching the positioning modes (responsive to a low-power condition or to

user command) changes the frequency with which *Sakamoto*'s terminal transmits and receives data (*i.e.*, updates the communication signaling protocol of the terminal)." Ex. 1003 ¶ 89. Against this showing, Patent Owner has not put forth any evidence to support its contention that "generat[ing] . . . an updated set" requires the generation of entirely new parameters or that such parameters cannot be taken from predetermined sets. As such, Patent Owner's position amounts to unsupported attorney argument; it does not undermine Petitioner's persuasive showing that *Sakamoto* teaches real-time updating of network signaling protocol sets in order to reduce power consumption via *Sakamoto*'s mode switching. *See, e.g.*, Ex. 1003 ¶¶ 88–89; Ex. 1004 ¶¶ 28, 29, 46.

Patent Owner also argues that *Sakamoto* updates its positioning modes based on charge level, and that *Sakamoto* does not disclose a "value that is responsive to a user input request." PO Sur-reply 11. At oral argument, Patent Owner explained this argument as meaning that the "value" must be known to the user. *See* Tr. 41:22–45:4. We do not agree with Patent Owner's argument because neither the language of claim 1 nor the Specification of the '774 patent requires the "value" to be known to the user. In particular, the '774 patent states that the "[u]pdated set of network communication signaling protocols, for instance, has value (e.g., X Y Z) responsive to user input request 430." Ex. 1001, 11:41–43. With respect to the embodiment of Figure 5, the '774 patent states further that the values "X Y Z" are request rate 420, location coordinates packet 422, and listen rate 425. *Id.* at 13:1–12, Fig. 5. Yet nothing in these descriptions requires the user to know what these values are or how they change based on the user input request. The '774 patent further provides examples of "value 419" as

“a user input screen control or mouse adjustable cursor value” and states that “user input request 430 adjusts value 419 to select an appropriate update set of network communication signaling protocols to achieve a desired user defined battery operating environment.” *Id.* at 11:51–53, 11:59–62. Again, the user input changes the value, but nothing in the ’774 patent requires the user’s knowledge of what the value is. Based on this understanding, we find that the user’s selection of an operating mode in Sakamoto via man-machine interface control unit 14 (i.e., “a user input request”) changes the “value” of the operating mode and/or the “value” of the request rate and listen rate associated with the selected operating mode. *See, e.g.*, Ex. 1003 ¶¶ 92–93, Ex. 1004 ¶ 28. As such, we determine that Sakamoto teaches an “updated set of network communication signaling protocols having a value that is responsive to a user input request.”

Based on the entire trial record, we are persuaded that Sakamoto’s normal sensitivity positioning mode, high sensitivity positioning mode, and power-off mode teach an “updated set of network communication signaling protocols.” *See, e.g.*, Ex. 1004 ¶¶ 5–10, 28. Petitioner also shows that Sakamoto either teaches, or an ordinarily skilled artisan would have appreciated from Sakamoto, that each of these modes has an associated “listen rate of the location coordinate packets from a satellite navigation system.” *See, e.g.*, Ex. 1003 ¶¶ 90–92, 94; Ex. 1004 ¶¶ 20, 24, 25, 28, 31, 34, 36, 37, 39, 40, 51. Petitioner likewise demonstrates that Sakamoto’s normal and high sensitivity modes have an associated “request rate of location coordinate packets to be communicated to a target host.” *See, e.g.*, Ex. 1003 ¶¶ 91, 92; Ex. 1004 ¶¶ 31–35, 40, 53. In addition, the user can select a preset threshold battery level using man-machine interface control

unit 14, which controls in real-time how positioning control unit 13 switches between modes (i.e., “responsive to a user input request”). *See, e.g.*, Ex. 1003 ¶¶ 87–88; Ex. 1004 ¶¶ 19, 20, 24, 29, 46. Thus, we are persuaded that Sakamoto’s man-machine interface control unit 14 and positioning control unit 13 act together as a “local battery power adjustment mechanism” that generates Sakamoto’s various modes. *See, e.g.*, Ex. 1004 ¶ 46, Fig. 1.

Claim 1 further recites “wherein the local battery power adjustment mechanism activates or deactivates at least one portion of the transceiver circuitry or the processor circuitry to conserve the battery charge level in response to the value.” Ex. 1001, 15:66–16:2. Petitioner cites Sakamoto’s teaching that positioning control unit 13 (a part of the recited “local battery power adjustment mechanism”) activates and deactivates GPS receiver 10 (a portion of the recited “transceiver circuitry” and “processor circuitry”) via GPS control unit 12. Pet. 36–37 (citing Ex. 1004 ¶¶ 19, 20, 24, 25, 29, 36). According to Petitioner, “the purpose of deactivating GPS receiver (and reactivating it only on demand) is to conserve battery charge level.” *Id.* at 37–38 (citing Ex. 1003 ¶ 95; Ex. 1004 ¶ 39). Patent Owner does not contest Petitioner’s analysis of this limitation. We are persuaded that Sakamoto’s positioning control unit 13 activating and deactivating GPS receiver 10 via GPS control unit 12 teaches this limitation. *See, e.g.*, Ex. 1003 ¶ 95; Ex. 1004 ¶¶ 19, 20, 24, 25, 29, 36, 39.

Based on the entire trial record, Petitioner has persuasively shown that Sakamoto teaches all limitations of claim 1 in light of the knowledge of a person of ordinary skill in the art. Thus, we determine Petitioner has shown

by a preponderance of the evidence that the subject matter of claim 1 would have been obvious over Sakamoto.

3. *Claim 4*

Claim 4 depends from claim 1 and recites that “the local battery power adjustment mechanism comprises a user adjustable electronic display that indicates a current level of battery power and allows a user a capability to adjust power level thereof.” Ex. 1001, 16:18–21. As discussed above, Petitioner maps the “local battery power adjustment mechanism” recited in claim 1 to Sakamoto’s man-machine interface control unit 14 and positioning control unit 13. *See supra* § II.D.2. For the “user adjustable electronic display,” Petitioner cites Sakamoto’s teaching that a “display unit [is] provided in the man-machine interface control unit 14.” Pet. 39 (quoting Ex. 1004 ¶ 13) (emphasis omitted). Petitioner further cites Sakamoto’s teaching of position control unit 13 “issu[ing] a remaining battery amount warning notification to the terminal user A via the man-machine interface control unit 14.” *Id.* (quoting Ex. 1004 ¶ 28). Petitioner contends that an ordinarily skilled artisan “would have understood that this remaining battery amount warning notification would have been ‘issue[d]’ on the display of man-machine interface control unit 14.” *Id.* (citing Ex. 1003 ¶ 96; Ex. 1004 ¶ 6). For “allow[ing] a user a capability to adjust power level,” Petitioner cites Sakamoto’s teachings of a user adjusting a power level of the terminal by selecting a positioning mode and by changing the battery threshold at which the device automatically switches from high to normal sensitivity positioning mode. *Id.* at 40 (citing Ex. 1004 ¶¶ 28–29).

Patent Owner relies on the same arguments discussed above with respect to claim 1. We are persuaded that Sakamoto teaches a display in man-machine interface control unit 14 that is used to present battery warning notifications to a user. *See, e.g.*, Ex. 1004 ¶¶ 6, 13, 28. We also are persuaded that the display in man-machine interface control unit 14 allows the user to adjust the power level by selecting modes and by allowing the user to set a battery power threshold for automatic battery conservation. *See, e.g.*, Ex. 1004 ¶¶ 28–29. Thus, we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claim 4 would have been obvious over Sakamoto.

4. *Claim 5*

Claim 5 depends from claim 4 and recites that

the local battery power adjustment mechanism comprises an automatic sleep mode to set at least one of the request rate of the location coordinate packets to the target host and the listen rate of the location coordinates from the satellite navigation system to a minimal level until the battery power monitor measures a sustainable battery charge level to process the at least one portion of an receive signal.

Ex. 1001, 16:22–29. For the “automatic sleep mode,” Petitioner cites Sakamoto’s teaching of “turning off the power of the GPS receiver so that longer operating time can be achieved.” Pet. 41 (quoting Ex. 1004 ¶ 51). Petitioner contends this would result in a listen rate of zero, which is a “minimal level.” *Id.* (citing Ex. 1003 ¶ 94). For the recited condition “until the battery power monitor measures a sustainable battery charge level to process the at least one portion of an receive signal,” Petitioner cites Sakamoto’s teaching that “the terminal side can recognize that the remaining

battery level is low and can cope with the charging of the battery.” *Id.*
(quoting Ex. 1004 ¶ 47). Petitioner contends an ordinarily skilled artisan

would have recognized that this “coping” with the battery being charged would have included switching the positioning mode back to normal sensitivity positioning mode or high sensitivity positioning mode once the remaining battery level was no longer below the threshold that caused the terminal to switch to power off mode.

Id. at 40–41 (citing Ex. 1003 ¶ 97).

Patent Owner relies on the same arguments discussed above with respect to claim 1. We are persuaded that Sakamoto teaches the recited “automatic sleep mode.” *See, e.g.*, Ex. 1004 ¶ 51. We also are persuaded by Mr. Andrews’s uncontested testimony that an ordinarily skilled artisan would have known that Sakamoto’s system switches back to normal or high sensitivity positioning mode once battery power has been replenished based on Sakamoto’s teaching of the terminal “cop[ing] with the charging of the battery.” *See, e.g.*, Ex. 1003 ¶ 97; Ex. 1004 ¶ 47. Thus, we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claim 5 would have been obvious over Sakamoto.

5. Claim 6

Claim 6 depends from claim 4 and recites that

the local battery power adjustment mechanism comprises a charge control management of the portable electronic tracking device that estimates charge capability and adjusts cycling of the at least one of a request rate of location coordinate packets to a target host and a listen rate of the location coordinate packets from the satellite navigation system to maximize charge capability.

Ex. 1001, 16:30–36. For “charge control management . . . that estimates charge capability,” Petitioner cites Sakamoto’s teaching that positioning control unit 13 receives a “battery remaining amount” from battery control unit 16. Pet. 42–43 (citing Ex. 1004, Fig. 1). Petitioner also cites Sakamoto’s teaching of positioning control unit 13 automatically shifting to normal sensitivity positioning mode based on a remaining battery amount warning. *Id.* at 43–44 (citing Ex. 1004 ¶ 29). For “adjust[ing] cycling,” Petitioner contends that “[c]hanging the positioning mode adjusts the cycling of request rate and the listen rate.” *Id.* at 44 (citing Ex. 1003 ¶ 98). Petitioner contends this mode switch is performed in order to reduce the power consumption and extend operating time, which meets the “maximize charge capability” limitation of claim 6. *Id.* (citing Ex. 1004 ¶ 46).

Patent Owner relies on the same arguments discussed above with respect to claim 1. We are persuaded that Sakamoto’s positioning control unit 13 (i.e., part of the “local battery power adjustment mechanism”) receives remaining battery amount information and shifts operating modes to adjust request rate and listen rate cycling. *See, e.g.*, Ex. 1003 ¶ 98; Ex. 1004 ¶ 29, Fig. 1. This “maximiz[es] charge capacity” by reducing power consumption. *See, e.g.*, Ex. 1004 ¶ 46. Thus, we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claim 6 would have been obvious over Sakamoto.

6. Claim 8

Independent claim 8 recites “[a] local charging management device to manage electrical resource capability for an electronic tracking device that is tracked by at least one other tracking device.” Ex. 1001, 16:43–45. For the

“local charging management device,” Petitioner cites Sakamoto’s battery, battery control unit 16, positioning control unit 13, and GPS control unit 12. Pet. 44. Petitioner maps the “electronic tracking device” to Sakamoto’s GPS receiver 10, communication control unit 11, GPS control unit 12, position control unit 13, man-machine interface control unit 14, satellite signal level detecting unit 15, battery control unit 16 and battery, and communication line status controlling unit 17. *Id.* at 13 (citing Ex. 1004 ¶ 19, Fig. 1), 44–45. For “track[ing] by at least one other tracking device,” Petitioner contends the “electronic tracking device” is tracked by position management server 2. *Id.* at 44–45; *see also id.* at 15–16 (analyzing similar limitation in claim 1).

Patent Owner does not contest Petitioner’s analysis of the preamble. Neither party addresses whether the preamble is limiting. We are persuaded that Sakamoto teaches a “local charging management device to manage electrical resource capability for an electronic tracking device that is tracked by at least one other tracking device.” *See, e.g.,* Ex. 1004 ¶¶ 3, 18–24, Fig. 1. Because Petitioner has shown that Sakamoto teaches the preamble, we need not determine whether the preamble is limiting. *See Nidec*, 868 F.3d at 1017.

Claim 8 further recites “a battery power level monitor.” Ex. 1001, 16:46. Petitioner maps this limitation to Sakamoto’s battery control unit 16 and GPS control unit 12 and relies on its analysis of the “battery power monitor” limitation of claim 1. Pet. 22–25, 45–46 (citing Ex. 1004, Fig. 1). Notwithstanding, Petitioner notes that its mapping is slightly different compared to the “battery power monitor” of claim 1 due to added functionality (discussed below) recited in claim 8. *Id.* at 45 n.5. Patent

Owner does not contest Petitioner's analysis of this limitation. Based on Petitioner's analysis from claim 1, we are persuaded that Sakamoto's battery control unit 16 and GPS control unit 12 teach the recited "battery power level monitor." *See, e.g.*, Ex. 1004 ¶¶ 19, 28, 39, Fig. 1.

Claim 8 further recites "a charging unit." Ex. 1001, 16:47. Petitioner cites the same analysis from claim 1 for the "battery having a battery charge level" limitation. Pet. 46. Patent Owner does not contest Petitioner's analysis of this limitation. Based on Petitioner's analysis from claim 1, we are persuaded that Sakamoto teaches "a charging unit." *See, e.g.*, Ex. 1004 ¶¶ 9, 10, 14, 15, 19, 28.

Claim 8 recites "an electrical power resource management component to adjust cycle timing of at least one of a request rate of location coordinate packets to a target host and a listen rate of the location coordinate packets responsive to an estimated charge level of the charging unit." Ex. 1001, 16:48–52. According to Petitioner, the '774 patent states that a local battery adjustment mechanism is one example of an "electrical resource management component." Pet. 46 (citing Ex. 1001, 13:13–15). As such, Petitioner cites its analysis from the "local battery power adjustment mechanism" limitation of claim 1. *Id.* Petitioner contends that the same analysis related to Sakamoto's switching of positioning modes teaches "adjust[ing] cycle timing." *See* Pet. 46–47.

Patent Owner argues that "*Sakamoto's* transitioning between positioning modes and corresponding different refresh rates . . . does not disclose '**adjust** cycle timing of at least one of a request rate . . . and a listen rate'" because Sakamoto merely teaches "changing from one refresh rate to a completely different refresh rate." PO Sur-reply 12. We do not agree with

Patent Owner’s argument for the same reasons discussed above with respect to claim 1. We find that Sakamoto’s changing of refresh rates—which is acknowledged by Patent Owner (*id.*)—teaches adjusting the cycle timing. Patent Owner also disputes Petitioner’s analysis to the extent that Sakamoto’s positioning modes do not disclose a schedule of repeating events or any updating of such schedule. *See* PO Resp. 10–12. Again, however, claim 8 does not require any such schedule, and we decline to read in a schedule requirement from the exemplary embodiments of the ’774 patent. Thus, we do not agree with Patent Owner’s argument.

As above, we are persuaded by Petitioner’s contentions (Pet. 47) that Sakamoto teaches “adjust[ing] . . . cycle rates (by switching positioning mode and therefore updating the communication signaling protocol) responsive to an estimated charge level (remaining battery amount) of the charging unit (battery).” *See, e.g.*, Ex. 1003 ¶¶ 98, 102; Ex. 1004 ¶¶ 5–10, 28, 29.

Claim 8 further recites

wherein the battery power level monitor measures a power level of the charging unit and adjusts a power level applied to location tracking circuitry responsive to one or more signal levels, the power level comprising a multitude of threshold values determined by a user or system administrator to intermittently activate or deactivate the location tracking circuitry to conserve power of the charging unit in response to the estimated charge level of the charging unit.

Ex. 1001, 16:53–61. Petitioner’s analysis of the “measures a power level of the charging unit” limitation is similar to that of claim 1; Petitioner contends “*Sakamoto* teaches battery control unit 16 measures a power level of the battery.” Pet. 48 (citing Ex. 1003 ¶ 101); *see also id.* at 23–24 (citing Ex. 1004 ¶¶ 28, 39). For “adjust[ing] a power level applied to location

tracking circuitry,” Petitioner cites Sakamoto’s teaching of changing the power level applied to GPS receiver 10 depending on positioning mode. *Id.* at 48–49 (citing Ex. 1004 ¶¶ 24, 25). Petitioner contends the adjustment to GPS receiver 10 is “responsive to one or more signal levels” based on Sakamoto’s detection of GPS satellite signal levels and teachings of (1) threshold K1, below which positioning control unit 13 automatically transitions to high sensitivity positioning mode; and (2) threshold K2, above which positioning control unit 13 automatically transitions to normal sensitivity positioning mode. *Id.* at 49–50 (citing Ex. 1004 ¶ 27).

For the recited “multitude of threshold values,” Petitioner cites Sakamoto’s teachings of two battery power level thresholds related to (1) the user-defined battery power level threshold below which the mode switches from high sensitivity positioning mode to normal sensitivity positioning mode; and (2) “a still lower-power mode whereby the GPS receiver is completely shut down.” Pet. 50–51 (citing Ex. 1004 ¶¶ 29, 39, 51). Regarding the “still-lower power mode,” Petitioner contends an ordinarily skilled artisan “would have understood these teachings of *Sakamoto* to indicate a second battery threshold below which this complete GPS power off occurs.” *Id.* at 51 (citing Ex. 1003 ¶ 103).

Patent Owner argues that Petitioner’s two cited thresholds from Sakamoto cannot teach the recited “multitude of threshold values.” PO Resp. 12–17. Patent Owner’s arguments turn on the construction of the term “multitude.” We have considered Patent Owner’s arguments regarding this term, and, as discussed above, we interpret the word “multitude” to include two. *See supra* § II.C. Thus, Petitioner’s two cited power level thresholds from Sakamoto (i.e., the battery power level thresholds triggering shifts

between (1) high sensitivity and normal mode; and (2) normal mode and power-off mode) teach the recited “multitude of threshold values” under this interpretation. *See, e.g.*, Ex. 1003 ¶ 103; Ex. 1004 ¶¶ 29, 39, 51.

Patent Owner does not otherwise contest Petitioner’s analysis of this limitation. We are persuaded that Sakamoto teaches measuring a power level of the battery (*see, e.g.*, Ex. 1004 ¶¶ 28, 39), adjusting a power level applied to GPS receiver 10 (*see, e.g.*, Ex. 1004 ¶¶ 24, 25), and making the adjustment to GPS receiver 10 responsive to a comparison with Sakamoto’s GPS satellite signal level thresholds K1 and K2 (*see, e.g.*, Ex. 1004 ¶ 27).

Based on the entire trial record, Petitioner has persuasively shown that Sakamoto teaches all limitations of claim 8 in light of the knowledge of a person of ordinary skill in the art. Thus, we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claim 8 would have been obvious over Sakamoto.

7. *Claim 10*

Claim 10 depends from claim 8 and recites a limitation similar to that of claim 6. Ex. 1001, 17:4–10. Petitioner relies on the same analysis from claim 6. Pet. 54. Patent Owner relies on the same arguments from claim 8. PO Resp. 12–17; PO Sur-reply 14. For the same reasons discussed above for claim 6 (*see supra* § II.D.5), we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claim 10 would have been obvious over Sakamoto.

8. *Claim 13*

Claim 13 depends from claim 8 and recites that “the listen rate of the location coordinates comprises a global positioning system (GPS) system refresh rate of the location coordinates.” Ex. 1001, 17:23–25. Petitioner cites its analysis from claim 1 and contends that “*Sakamoto*’s listen rate of location coordinates is a GPS system refresh rate of location coordinates.” Pet. 54 (citing Ex. 1003 ¶ 108); *see also id.* at 31–32 (Petitioner’s analysis of *Sakamoto*’s high sensitivity positioning mode and of how “a continuously operating GPS receiver has an associated refresh rate of location coordinates”). Patent Owner relies on the same arguments from claim 8. PO Resp. 12–17; PO Sur-reply 14. For the same reasons discussed above for claim 1 (*see supra* § II.D.2), we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claim 13 would have been obvious over *Sakamoto*.

9. *Claim 15*

Claim 15 depends from claim 8 and recites that “the battery power level monitor measures a power level of the charging unit and substantially automatically adjusts power usage responsive to available power of the charging unit to maximize power unit life.” Ex. 1001, 17:29–33. For “measur[ing] a power level of the charging unit,” Petitioner cites *Sakamoto*’s teaching that battery control unit 16 monitors a remaining battery amount in order to determine when battery power falls below a predetermined threshold. Pet. 22 (citing Ex. 1004 ¶¶ 19, 28), 54. Regarding the recited adjustment to power usage, Petitioner cites *Sakamoto*’s teaching of automatically changing from high to normal sensitivity power mode

based on a notification sent when battery control unit 16 detects that the battery level is lower than a predetermined threshold. *Id.* at 54–55 (citing Ex. 1004 ¶¶ 29, 46). Petitioner contends an ordinarily skilled artisan “would have understood that this would have the purpose (and the effect) of increasing (maximize) the battery (power unit) life.” *Id.* at 55 (citing Ex. 1003 ¶ 109).

Patent Owner relies on the same arguments discussed above with respect to claim 8. PO Resp. 12–17; PO Sur-reply 14. We are persuaded that Sakamoto’s battery control unit 16 monitors a remaining battery amount and notifies positioning control unit 13 when appropriate to switch modes and maximize the life of the battery. *See, e.g.*, Ex. 1004 ¶¶ 19, 28, 29, 46. Thus, we determine Petitioner has shown by a preponderance of the evidence that the subject matter of claim 15 would have been obvious over Sakamoto.

E. Obviousness Ground Based on Sakamoto and AAPA

Petitioner contends the subject matter of claims 1, 4–6, 8, 10, 13, and 15 would have been obvious over the combination of Sakamoto and AAPA. Pet. 56–60. As discussed above, Petitioner has demonstrated that the subject matter of claims 1, 4–6, 8, 10, 13, and 15 would have been obvious over Sakamoto, so we do not reach the ground based on Sakamoto and AAPA. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the

proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

F. Obviousness Ground Based on Sakamoto and Hayasaka

Petitioner contends the subject matter of claims 1, 4–6, 8, 10, 13, and 15 would have been obvious over Sakamoto and Hayasaka. Pet. 60–71. We already have found claims 1, 4–6, 8, 10, 13, and 15 to be unpatentable over Sakamoto, so we do not reach the ground based on Sakamoto and Hayasaka. *See SAS*, 138 S. Ct. at 1359; *Boston Sci.*, 809 F. App’x at 990.

III. PATENT OWNER’S MOTION TO AMEND

Pursuant to 35 U.S.C. § 316(d)(1) and 37 C.F.R. § 42.121(a), Patent Owner moves to replace claims 1, 4–6, 8, 10, 13, and 15 of the ’774 patent with proposed substitute claims 20, 23–25, 27, 29, 32, and 34, respectively. MTA 1; MTA Reply 1. The motion is contingent on our determination as to whether a preponderance of the evidence establishes that claims 1, 4–6, 8, 10, 13, and 15 of the ’774 patent are unpatentable. MTA 1. As discussed above, we determine that original claims 1, 4–6, 8, 10, 13, and 15 of the ’774 patent have been shown to be unpatentable by a preponderance of the evidence. *See supra* § II.D.2–9. Therefore, we proceed to address Patent Owner’s motion to amend.

A. Proposed Substitute Claims

Independent proposed substitute claims 20 and 27, which are illustrative of the proposed substitute claims, are reproduced below with underlining to indicate added text and strikethrough to indicate deleted text.

20. A portable electronic tracking device to monitor location coordinates of one or more individuals and objects using a satellite navigation system, the portable electronic tracking device comprising:

a battery having a battery charge level;

transceiver circuitry;

processor circuitry;

a battery power monitor to measure in real-time the battery charge level and to make a prediction of an estimated remaining battery charge level in response to the battery charge level; and

local battery power adjustment mechanism to generate in substantially real-time an updated set of network communication signaling protocols associated with at least one of a request rate representing a repeating time interval for ~~of~~ location coordinate packets to be communicated to a target host and a listen rate representing a repeating time interval for receipt of the location coordinate packets from a satellite navigation system, the updated set of network communication signaling protocols having a value that is responsive to a user input request and representing a timing schedule for at least one of the request rate and the listen rate;

wherein the local battery power adjustment mechanism activates or deactivates at least one portion of the transceiver circuitry or the processor circuitry to conserve the battery charge level in response to the value.

27. A local charging management device to manage electrical resource capability for an electronic tracking device that is tracked by at least one other tracking device comprising:

a battery power level monitor;

a charging unit; and

an electrical power resource management component to adjust cycle timing of at least one of a request rate representing a repeating time interval for transmission of location coordinate packets to a target host and a listen rate representing a repeating time interval for receipt of the location coordinate packets responsive to an estimated charge level of the charging unit, the cycle timing representing a timing schedule for at least one of the request rate and the listen rate,

wherein the battery power level monitor measures a power level of the charging unit and adjusts a power level applied to location tracking circuitry responsive to one or more signal levels, the power level comprising a multitude of threshold values determined by a user or system administrator to intermittently activate or deactivate the location tracking circuitry to conserve power of the charging unit in response to the estimated charge level of the charging unit.

MTA 25–26, 28–29.

B. Procedural Requirements

“Before considering the patentability of any substitute claims, . . . the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.” *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15, 4–8 (PTAB Feb. 25, 2019) (precedential). Patent Owner bears the burden of proving these requirements by a preponderance of the evidence. 37 C.F.R. § 42.121(d)(1).

1. *Claim Listing*

The motion to amend includes a claim listing that clearly shows the changes, as required by 37 C.F.R. § 42.121(b). *See* MTA 25–30; *Lectrosonics*, Paper 15 at 8.

2. *Reasonable Number of Substitute Claims*

We now consider whether the motion to amend proposes a reasonable number of substitute claims. 35 U.S.C. § 316(d)(1)(B). “There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim.” *Lectrosonics*, Paper 15 at 4–5 (citing 37 C.F.R. § 42.121(a)(3)). Patent Owner’s motion originally proposed 15 substitute claims, including 8 proposed substitute claims corresponding to claims challenged in this *inter partes* review and 7 proposed substitute claims corresponding to dependent claims that are not challenged here. MTA 25–30. In our Preliminary Guidance, we indicated that “Section 316(d) does not permit Patent Owner to cancel or propose substitutes for non-challenged claims,” so we would “only consider the Motion with respect to the proposed substitute claims that correspond to the challenged claims.” PG 3–4. Patent Owner acknowledged this in its reply and now agrees that “only corresponding proposed substitute claims 20, 23–25, 27, 29, 32, and 34 are to be considered in relation to Patent Owner’s Motion to Amend.” MTA Reply 1. As such, the Petition challenges 8 claims, and the motion to amend proposes 8 substitute claims. *Id.* We determine that the number of proposed substitute claims is reasonable.

3. *Respond to a Ground of Unpatentability Involved in the Trial*

Next, we consider whether the proposed substitute claims respond to a ground of unpatentability involved in this trial. *Lectrosonics*, Paper 15 at 5–6 (citing 37 C.F.R. § 42.121(a)(2)(i)). Patent Owner characterizes its amendments as adding the following limitations to the original claims:

(1) that request rate represents a repeating time interval for location coordinate packets to be communicated to a target host in proposed substitute independent claims 20 and 27; (2) that listen rate represents a repeating time interval for receipt of the location coordinate packets in proposed substitute independent claims 20 and 27; (3) that the updated set of network communication signaling protocols represent a timing schedule for at least one of the request rate and the listen rate in proposed substitute independent claim 20; and (4) that the cycle timing represents a timing schedule for at least one of the request rate and the listen rate in proposed substitute independent claim 27.

MTA 2–3. Patent Owner highlights these added limitations in asserting that that the proposed substitute claims are patentable over the references in the instituted grounds. *See id.* at 3–4. Petitioner does not argue otherwise. Based on Patent Owner’s showing, we determine that the amended language in the proposed substitute claims is responsive to the grounds of unpatentability involved in this trial.

4. *No Enlargement to the Scope of the Claims*

We also consider the breadth of the proposed substitute claims. “A motion to amend may not present substitute claims that enlarge the scope of the claims of the challenged patent or introduce new subject matter.” *Lectrosonics*, Paper 15 at 6–7 (citing 35 U.S.C. § 316(d)(3); 37 C.F.R. § 41.121(a)(2)(ii)). For the independent proposed substitute claims, Patent Owner’s proposed amendments add several limitations, including the ones

highlighted directly above. Based on the added limitations, Patent Owner contends that the proposed substitute claims do not enlarge the scope of any original claim. MTA 3.

Petitioner contends that proposed substitute claims 20, 23–25, 27, 29, 32, and 34 impermissibly attempt to broaden the scope of corresponding original claims 1, 4–6, 8, 10, 13, and 15. MTA Opp. 3. Specifically, Petitioner contends that proposed substitute claims 20 and 27 require “an updated set of network communication signaling protocols associated with at least one of a request rate representing a repeating time interval for [[of]] location coordinate packets to be communicated to a target host and a listen rate representing a repeating time interval for receipt of the location coordinate packets from a satellite navigation system,” where corresponding original claims 1 and 8 require that the request rate and listen rate actually be *for* the corresponding packets. *Id.* (alteration in original) (citing MTA 25–26). According to Petitioner, a system where a refresh rate merely “represent[s]” (but does not include) an actual transmission or reception rate for a corresponding type of packet would satisfy proposed substitute claims 20 and 27, but would not satisfy corresponding original claims 1 and 8. *Id.* at 3–4.

Proposed substitute claims 20 and 27 require that the recited “request rate” and “listen rate” represent “a repeating timing interval.” Corresponding original claims 1 and 8 do not recite such a requirement, so these proposed amendments represent a narrowing of the claims. We do not agree with Petitioner’s argument that the use of word “representing” in the proposed amendments acts to broaden the proposed substitute claims. Petitioner’s argument is premised on the notion that the word “of” in the

challenged claims means “includes.” *See* MTA Opp. 3–4. But Petitioner does not support its argument with any record evidence, and we are not persuaded that the word “representing” meaningfully changes the scope of the proposed substitute claims compared to the word “of” in the original claims. Petitioner’s argument also does not account for the narrowing of claim scope caused by the added “repeating time interval” limitations. Thus, we determine that the limitations added by Patent Owner result in claims that are narrower than the original claims.

5. *No New Matter*

We now consider whether proposed substitute claims 20, 23–25, 27, 29, 32, and 34 have introduced new matter. “[T]he Board requires that a motion to amend set forth written description support in the originally filed disclosure of the subject patent for each proposed substitute claim, and also set forth support in an earlier filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought.” *Lectrosonics*, Paper 15 at 7 (citing 37 C.F.R. § 42.121(b)(1)–(2)). For this requirement, Patent Owner must cite “to the *original disclosure of the application*, as filed, rather than to the patent as issued.” *Id.* at 8 (emphasis added). In this case, the original disclosure is the ’451 application. Ex. 1001, code (21).

Nevertheless, in its motion to amend, Patent Owner cites the published version of the ’451 application, U.S. Patent Application Publication No. 2009/0189807 A1 (“the ’807 publication”), to show support for the proposed substitute claims. *See* MTA 4–16 (citing Ex. 2013); Ex. 2013 (the ’807 publication). In our Preliminary Guidance, we noted that

Patent Owner was required to cite the '451 application. PG 6 (citing *Lectrosonics* for the proposition that a motion to amend must set forth written description support in the originally filed disclosure of the subject patent). Patent Owner responded by filing a copy of the '451 application with its reply in support of the motion to amend. *See* Ex. 2017. Patent Owner's reply also included some citations to the '451 application as part of Patent Owner's arguments that various amendments are supported by the original disclosure document. *See* MTA Reply 2–5.

Via its belated references to the '451 application, Patent Owner has complied, to some degree, with the requirement from *Lectrosonics* that its motion set forth written description support in the original disclosure document. And, even to the extent Patent Owner's only citations in the record are made to the '807 publication, we find the '807 publication to be substantially identical to the '451 application. Moreover, Petitioner does not base any of its arguments on potential differences between the publication and the original application. Thus, under the particular circumstances of this case, we determine that any error Patent Owner made is harmless and decline to deny Patent Owner's motion to amend for failure to comply with the original disclosure requirement of *Lectrosonics*. Hereinafter, we refer to the '451 application when discussing written description arguments. We turn now to those arguments.

Petitioner contends that Patent Owner has not shown that the '451 application adequately supports “a request rate representing a repeating time interval for ~~of~~ location coordination packets to be communicated to a target host and a listen rate representing a repeating time interval for receipt of the location coordinate packets from a satellite navigation system,” as

recited in proposed substitute claim 20 and similarly recited in proposed substitute claim 27. MTA Opp. 5. Specifically, Petitioner argues that neither the word “represent” nor any variation thereof appears in the ’451 application. *Id.* Petitioner also argues that there is no disclosure in the ’451 application of any “time interval” that repeats, and the word “repeating” only appears in the Specification in the context of a repeatedly tapping Morse code to generate a distress signal. *Id.* (citing Ex. 1001, 9:58–62). Petitioner additionally argues that there is no disclosure of how a “rate” that “represents” a “time interval,” repeating or otherwise, is in any way different from any other rate disclosed in the ’451 application. *Id.* Petitioner further argues that the paragraphs cited by Patent Owner in its motion to amend (i.e., paragraphs 53, 64, 65, and 66 of the ’807 publication⁸) merely describe that a communication protocol has an associated request rate or listen rate that may be specified by a frequency or an interval, and do not provide adequate written description support for a rate “representing a repeating time interval.” *Id.* at 5–6.

In reply, Patent Owner cites the ’451 application as disclosing that “portable tracking device 402 adjusts settings (an internal time schedule)” and “checks internal time schedule to determine if it should listen for (perform a location lookup of) location coordinates 422 from satellite navigation system 403.” MTA Reply 2 (quoting Ex. 2017, 18:7–12). Patent Owner also cites various examples in the ’451 application related to request rate and listen rate schedules for tracking a dog, a car, and rented construction equipment. *Id.* (citing Ex. 2017, 21:8–22:16).

⁸ These paragraphs correspond to page 17, lines 12–21, and page 21, line 8 to page 22, line 16 in the ’451 application. *See* Ex. 2017.

Based on our understanding of this limitation (*see infra* § III.C), we do not agree with Petitioner’s arguments. Regarding the request rate and listen rate, the ’451 application discloses that the “updated set of network communication signaling protocols . . . includes an update rate (e.g., refresh rate) of location coordinate packets 446.” Ex. 2017, 17:14–16. In turn, “the update rate of location coordinate packets 446 includes request rate 420 of location coordinate packets 422 by target host 452 . . . and/or listen rate 425 of location coordinate packets 422 by portable electronic tracking device 402.” *Id.* at 17:16–19. Regarding the repeating time interval, the ’451 application discloses that “[i]n response to receipt of updated set of network communication signaling protocols, portable location tracking device 402 adjusts settings (an internal time schedule)” and “[p]ortable location tracking device 402 checks internal time schedule to determine if it should listen for (perform a location lookup of) location coordinates 422 from satellite navigation system 403.” *Id.* at 18:7–15. Further, the ’451 application describes examples of update rate intervals (in minutes) for tracking a dog, a car, and rented construction equipment that constitute the repeating time intervals for the request rate and/or listen rate. *See id.* at 21:8–22:16. In light of these disclosures, we determine that the ’451 application adequately supports “a request rate representing a repeating time interval for of location coordination packets to be communicated to a target host and a listen rate representing a repeating time interval for receipt of the location coordinate packets from a satellite navigation system,” as recited in proposed substitute claim 20 and similarly recited in proposed substitute claim 27.

For these reasons, and considering Patent Owner's evidence of support in the '807 publication and the '451 application, we determine that Patent Owner has shown adequate written description support for proposed substitute claims 20, 23–25, 27, 29, 32, and 34.

6. *Conclusion Regarding Procedural Requirements*

In view of the above, we determine that Patent Owner has shown, by a preponderance of the evidence, that its motion to amend meets all of the statutory and regulatory requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. We now proceed to consider whether Petitioner has met its burden of persuasion with respect to patentability. 37 C.F.R. § 42.121(d)(2).

C. *Claim Interpretation*

Patent Owner puts forth a claim construction for the following limitation in proposed substitute claim 20:

at least one of a request rate representing a repeating time interval for ~~of~~ location coordinate packets to be communicated to a target host and a listen rate representing a repeating time interval for receipt of the location coordinate packets from a satellite navigation system, the updated set of network communication signaling protocols . . . representing a timing schedule for at least one of the request rate and the listen rate.

MTA 16–17. Patent Owner contends this limitation requires that “the intervals represented by the request rate and the listen rate, as part of the updated set of network communication signaling protocols, represent a timing schedule for when the events occur.” *Id.* at 17. Patent Owner contends this construction is consistent with the proposed claim language itself and with the Specification; in support of this contention, Patent Owner

reproduces block quotations of portion of the proposed claim language and an excerpt from the Specification, but Patent Owner does not explain how these block quotations support its contention. *Id.* at 17–19 (quoting MTA 25; Ex. 1001, 12:1–18). Patent Owner also states that the same construction should apply to the similar language in proposed substitute claim 27. *Id.* at 17.

Petitioner disputes Patent Owner’s proposed construction insofar as it “requires that the schedule indicate ‘when’—rather than ‘how often’—the events occur.” MTA Opp. 2. In support of this argument, Petitioner notes that the Specification of the ’774 patent states that “refresh rate 446” is one example of a schedule. *Id.* (citing Ex. 1001, 12:59–60). Petitioner further notes that refresh rate 446 is shown to be a time interval (i.e., “10 min”) in Figure 4. *Id.* (citing Ex. 1001, Fig. 4). Petitioner additionally notes that the ’774 patent describes time intervals in minutes as exemplary schedules for tracking a dog, a car, and rented construction equipment. *Id.* at 2–3 (citing Ex. 1001, 14:1–57). As such, Petitioner contends that a “timing schedule” does not require an indication of *when* an event should occur. *Id.* at 3.

We agree with Petitioner that the Specification of the ’774 patent includes several examples where a “timing schedule” is indicated with time intervals denominated in minutes. *See* Ex. 1001, 14:1–57, Fig. 4. We additionally agree that a refresh rate is given as an example of a timing schedule in the Specification. *Id.* at 12:57–62 (describing an exemplary “timing schedule (e.g., refresh rate 446) to maximize effectiveness of request rate 420 and listen rate 425 in response to substantially real-time measured velocity of travel of portable electronic tracking device 402”). For these reasons, we reject Patent Owner’s contention (MTA 17) that the recited

“timing schedule” must include an indication of *when* an event must occur. Instead, we apply the plain and ordinary meaning to this limitation and note that time intervals (e.g., refresh rates) in minutes are described as exemplary timing schedules in the Specification of the ’774 patent.

Accordingly, we determine that no terms of the proposed substitute claims require explicit construction. *See Nidec*, 868 F.3d at 1017; *Vivid*, 200 F.3d at 803.

D. Whether the Proposed Substitute Claims Are Unpatentable Under 35 U.S.C. § 112 ¶ 1

Petitioner contends that proposed substitute claims 20, 23–25, 27, 29, 32, and 34 are unpatentable under 35 U.S.C. § 112 ¶ 1 for failing to satisfy the written description requirement. MTA Opp. 4–6. The parties’ arguments for this issue are the same as discussed above with respect to the new matter analysis. *See supra* § III.B.5. Thus, for the same reasons discussed above, we determine that Petitioner has not shown, by a preponderance of the evidence, that proposed substitute claims 20, 23–25, 27, 29, 32, and 34 are unpatentable for failing to comply with 35 U.S.C. § 112 ¶ 1.

E. Patentability of Proposed Substitute Claims 20, 23–25, 27, 29, 32, and 34 over Sakamoto

Petitioner contends the subject matter of proposed substitute claims 20, 23–25, 27, 29, 32, and 34 would have been obvious over Sakamoto. MTA Opp. 7–15; MTA Sur-reply 7–10. Patent Owner disputes Petitioner’s contentions. MTA 20–22; MTA Reply 5–9.

1. *Proposed Substitute Claim 20*

Petitioner's analysis for proposed substitute claim 20 builds upon its analysis for original claim 1 from the Sakamoto obviousness ground discussed above. We now focus on the amendments in proposed substitute claim 20.

Proposed substitute claim 20 recites “a request rate representing a repeating time interval for ~~of~~ location coordinate packets to be communicated to a target host.” MTA 25. Petitioner cites Sakamoto's teaching of position management/positioning server 2 sending position search request messages to position information communication terminal 1. MTA Opp. 7 (citing Ex. 1004 ¶¶ 31–34). In particular, Petitioner cites Sakamoto's teaching of sending position search request messages at a “short cycle” in normal or high sensitivity positioning modes. *Id.* (citing Ex. 1004 ¶ 40). Petitioner further notes that Sakamoto's terminal 1 responds to the position search request message with a search response message that includes position information. *Id.* at 8 (quoting Ex. 1004 ¶¶ 34–35). Petitioner also cites Mr. Andrews's testimony that “‘short cycle’ tracking would involve sending these position search request messages at a ‘regular’ rate, *i.e.*, such requests would be transmitted at a ‘repeating time interval’ (*i.e.*, with a particular frequency) to the position information communication terminal.” *Id.* at 8–9 (citing Ex. 1003 ¶¶ 91, 93). Petitioner additionally references its analysis from the Petition regarding Sakamoto's adjusting positioning modes responsive to an estimated charge level of the charge unit and regarding how each mode has an associated refresh rate. *Id.* at 9 (citing Pet. 31–34). Petitioner also contends an ordinarily skilled artisan would

have known that, in Sakamoto's power-off mode, the GPS unit in terminal 1 has an associated transmission rate of 0 Hz. *Id.* (citing Ex. 1003 ¶ 94).

Patent Owner does not dispute Petitioner's analysis of the "request rate" limitation of proposed substitute claim 20. We are persuaded that Sakamoto's positioning server 2 sends position search request messages to terminal 1 at a "short cycle" in normal or high sensitivity positioning modes, which teaches the recited "request rate representing a repeating time interval for ~~of~~ location coordinate packets to be communicated to a target host." *See, e.g.,* Ex. 1003 ¶ 91; Ex. 1004 ¶¶ 31–34, 40.

Proposed substitute claim 20 further recites "a listen rate representing a repeating time interval for receipt of the location coordinate packets from a satellite navigation system." MTA 25. Petitioner contends that Sakamoto's terminal 1 "receives GPS location coordinate packets at a regular rate and that this rate (and the corresponding interval) changes based on the positioning mode." MTA Opp. 10. In particular, Petitioner contends that "*Sakamoto's* position information communication terminal, when continuously operated, has an associated update rate and that, as such, would 'listen' for GPS packets at a 'repeating time interval.'" *Id.* at 11. Petitioner links continuous operation with Sakamoto's high sensitivity positioning mode and contends that, in such a mode, "many GPS receivers generate a position update once per second (i.e., at a rate of 1 Hz)." *Id.* at 10 (quoting Ex. 1003 ¶ 90). Petitioner additionally contends that Sakamoto's normal positioning mode has a listen rate with a "repeating time interval" insofar as Sakamoto sends a satellite signal level request message at "the cycle set in advance in the position information database." *Id.* at 11–12 (citing Ex. 1003 ¶ 92; Ex. 1004 ¶ 37). Petitioner again contends an ordinarily skilled artisan

would have known that, in Sakamoto's power-off mode, the GPS unit in terminal 1 has an associated refresh rate of 0 Hz. *Id.* at 12 (citing Ex. 1003 ¶ 94).

Patent Owner argues that "*Sakamoto's* refresh rate is not the same as 'update rate 446/refresh rate 446/refresh rate' as disclosed in the '451 application." MTA Reply 7. Patent Owner, however, does not identify how Sakamoto's refresh rate differs from that disclosed in the '451 application. In particular, the '774 patent and the '451 application describe an embodiment where "listen rate 425 of location coordinate packets 422 to the host target 428 and response rate 425 include global positioning system (GPS) system refresh rate 446." Ex. 1001, 13:40–43; Ex. 2017, 20:19–21; *see also* MTA Sur-reply 8 (Petitioner making same argument). Therefore, we are persuaded that Sakamoto's GPS system refresh rate, which Petitioner discusses in conjunction with Sakamoto's high sensitivity positioning mode, is a refresh rate in the same sense described in the '774 patent and the '451 application. Pet. 31–32 (citing Ex. 1003 ¶ 90; Ex. 1004 ¶¶ 25, 36), 34 (chart).

Furthermore, Mr. Andrews explains that "a continuously operating GPS receiver (such as *Sakamoto's* GPS receiver operating in high sensitivity positioning mode) has an associated update rate," e.g., once per second (1 Hz). Ex. 1003 ¶ 90. Mr. Andrews also testifies that "the rate at which a GPS receiver listens for . . . signals (the claim[ed] 'location coordinate packets') from GPS satellites is tied to its update rate." *Id.* Thus, consistent with the disclosures in the '774 patent and the '451 application, we are persuaded that Sakamoto's GPS refresh rate teaches the recited "listen rate representing a repeating time interval for receipt of the location coordinate

packets from a satellite navigation system” with respect to Sakamoto’s high sensitivity positioning mode. *See* MTA Opp. 9–10; *see also* MTA 30 (Patent Owner’s proposed substitute claim 32 reciting that “the listen rate of the location coordinates comprises a global positioning system (GPS) system refresh rate of the location coordinates”); MTA Reply 5 (Patent Owner acknowledging that “request rate, listen rate, and update rate/refresh rate may be represented as time intervals”). We also are persuaded that Sakamoto teaches the “listen rate” limitation insofar as Sakamoto has a periodic GPS listen rate in normal mode at “the cycle set in advance in the position information database.” *See, e.g.*, Ex. 1003 ¶ 92; Ex. 1004 ¶ 37.

Proposed substitute claim 20 further recites “the updated set of network communication signaling protocols having a value that is responsive to a user input request and representing a timing schedule for at least one of the request rate and the listen rate.” MTA 25–26. Petitioner contends that the disclosed examples of a “schedule” in the ’774 patent “correspond to either a time interval or an update frequency, no different from the short-cycle tracking request rate or GPS listen rate present in *Sakamoto* and explained by Mr. Andrews.” MTA Opp. 13–14 (citing Ex. 1003 ¶ 89–94; Ex. 1004 ¶¶ 37, 40). Thus, Petitioner contends that each of Sakamoto’s positioning modes “has a set associated refresh rate.” *Id.* at 14. Petitioner additionally contends that “the ’774 Patent gives ‘refresh rate’ as one example of a ‘schedule,’” so “*Sakamoto*’s disclosure of per-mode refresh rates for the listen rate and request rate teaches or otherwise renders obvious” the “timing schedule” limitation. *Id.* at 14–15.

Patent Owner disputes Petitioner’s analysis of the “timing schedule” limitation. In particular, Patent Owner cites the ’451 application for the

proposition that “a time schedule is utilized to determine when to listen for location coordinates (i.e., ‘listen rate 425’) and transmit those location coordinates (i.e., ‘request rate 420’).” MTA Reply 4 (citing Ex. 2017, 18:7–9). Moreover, according to Patent Owner,

“request rate” and “listen rate” represent intervals of a “timing schedule” for when events (i.e., listen for location coordinates and transmit location coordinates) occur while “update rate 446/refresh rate 446/refresh rate” is an update to the timing schedule that includes “request rate 420 ... and/or listen rate 425” as explicitly disclosed by the ‘451 application.

Id. at 5 (citing Ex. 2017, 17:17–19). Patent Owner further argues that the recited “updated set of network communication signaling protocols” is “a distinct element, in particular distinct from either a ‘request rate’ or a ‘listen rate.’” *Id.* at 8.

As discussed above (*see supra* § III.C), we do not agree that the recited “timing schedule” must be distinct from a refresh rate. Rather, Petitioner cites several examples establishing that “the ’774 Patent uses the terms ‘refresh rate,’ ‘update rate’ and ‘timing schedule’ interchangeably” with respect to reference numeral 446. MTA Sur-reply 3–4 (citing Ex. 1001, 11:56–57, 12:59–60, 13:33). Nor do we understand Patent Owner’s argument that the ’774 patent’s use of the abbreviation “e.g.” should be read as “based on” rather than “for example” in the context of describing timing schedules. MTA Reply 4 (quoting Ex. 2017, 19:15–19⁹) (arguing that “timing schedule (e.g., refresh rate 446)” should be interpreted as “‘timing schedule’ based on ‘refresh rate 446’”). Instead, the natural reading of the

⁹ This disclosure from the ’451 application is the same as column 12, lines 57–62 from the issued ’774 patent.

'774 patent's Specification is that a refresh rate is an example of timing schedule. Ex. 1001, 12:57–62. Based on this understanding, we are persuaded by Petitioner's contention that "*Sakamoto*'s short-cycle tracking request rate and GPS listen rate 'represent[] a timing schedule' for the request rate and the listen rate, respectively." MTA Opp. 13–14 (alteration by Petitioner) (citing Ex. 1003 ¶¶ 89–94; Ex. 1004 ¶¶ 37, 40). We also agree with Petitioner that the "refresh rates for the location coordinate packets transmitted to a target host and received from a satellite navigation system," which are associated with each of *Sakamoto*'s three positioning modes, teach the "timing schedule" limitation. *See id.* at 13–15 (including chart on page 14 where each row represents a "timing schedule" for a given mode from *Sakamoto*).

Patent Owner also repeats several arguments that it makes with respect to the original claims. For example, Patent Owner again argues that *Sakamoto* does not teach "the updated set of network communication signaling protocols having a value that is responsive to a user input request." MTA Reply 6–7. In particular, Patent Owner argues that "none of *Sakamoto*'s thresholds 'represent[] a timing schedule for at least one of the request rate and the listen rate' and, therefore, *Sakamoto* does not disclose a 'value that is responsive to a user input request.'" *Id.* at 7. We do not agree for reasons similar to those discussed above with respect to original claim 1. *See supra* § II.D.2. In particular, Petitioner relies on *Sakamoto*'s teaching of a user selecting a positioning mode. Pet. 34–35 (citing Ex. 1004 ¶ 26). As discussed with respect to claim 1, this changes the "value" of the operating mode and/or the "value" of the request rate and listen rate associated with the selected operating mode. *See, e.g.,* Ex. 1003 ¶¶ 92–93; Ex. 1004 ¶ 28.

And, as discussed directly above, changing Sakamoto's operating mode changes the refresh rates for location coordinate packets transmitted to a target host and received from a satellite navigation system, which is a "timing schedule" as described in the '774 patent. *See, e.g.*, Ex. 1001, 12:57–62; Ex. 1004 ¶¶ 37, 40. Thus, we do not agree with Patent Owner's arguments.

Patent Owner additionally argues that "*Sakamoto* does not disclose an **updated** set of network communication signaling protocols that has a user input request responsive value and represents a timing schedule." MTA Reply 8. Patent Owner further argues that "*Sakamoto* cannot disclose a refresh rate that is generated in substantially real-time." *Id.* at 9. We do not agree with these arguments for the same reasons discussed above for original claim 1. *See supra* § II.D.2. As acknowledged by Patent Owner at the oral hearing, the "updated set based on the claim language would include either/or both a refresh rate and a listen rate." Tr. 39:17–18. Petitioner has established as much because changing Sakamoto's positioning modes updates the listen rate and request rate. *See, e.g.*, Ex. 1003 ¶ 89; Ex. 1004 ¶¶ 5–10, 28. We also are persuaded that Sakamoto's "automatic shift" from high sensitivity mode to normal mode based on the battery falling below a threshold teaches the "substantially real-time" limitation. *See, e.g.*, Ex. 1003 ¶ 88; Ex. 1004 ¶¶ 29, 46.

The remaining limitations in proposed substitute claim 20 are the same as in original claim 1. We have discussed these limitations with respect to claim 1 of the Sakamoto obviousness ground above. *See supra* § II.D.2.

Having considered Petitioner's contentions and evidence and Patent Owner's arguments, we find that Sakamoto teaches every limitation of proposed substitute claim 20 in light of the knowledge of a person of ordinary skill in the art. Thus, we determine Petitioner has shown by a preponderance of the evidence that the subject matter of proposed substitute claim 20 would have been obvious over Sakamoto.

2. *Proposed Substitute Claims 23–25*

Proposed substitute claims 23–25 depend directly or indirectly from proposed substitute claim 20 and are the same as original claims 4–6 except that the claim dependencies have been updated. We have analyzed all limitations of proposed substitute claims 23–25 above. *See supra* §§ II.D.3–5. Thus, for the same reasons, we determine Petitioner has shown, by a preponderance of the evidence, that the subject matter of proposed substitute claims 23–25 would have been obvious over Sakamoto.

3. *Proposed Substitute Claim 27*

Petitioner's analysis for proposed substitute claim 27 builds upon its analysis for original claim 8 in the Sakamoto obviousness ground. We now focus on the amendments in proposed substitute claim 27.

Proposed substitute claim 27 recites

an electrical power resource management component to adjust cycle timing of at least one of a request rate representing a repeating time interval for transmission of location coordinate packets to a target host and a listen rate representing a repeating time interval for receipt of the location coordinate packets responsive to an estimated charge level of the charging unit.

MTA 28. Petitioner relies on the same analysis for the “repeating time interval” limitations discussed above with respect to proposed substitute claim 20. MTA Opp. 7–12. Patent Owner also relies on the same arguments discussed above. MTA Reply 5–9.

Proposed substitute claim 27 further recites “the cycle timing representing a timing schedule for at least one of the request rate and the listen rate.” MTA 28. Petitioner relies on the same analysis for the “timing schedule” limitation discussed above with respect to proposed substitute claim 20. MTA Opp. 13–15. Patent Owner also relies on the same arguments discussed above. MTA Reply 5–9.

Thus, based on the same analysis discussed above (*see supra* §§ II.D.6, III.E.1), we determine Petitioner has shown, by a preponderance of the evidence, that the subject matter of proposed substitute claim 27 would have been obvious over Sakamoto.

4. Proposed Substitute Claims 29, 32, and 34

Proposed substitute claims 29, 32, and 34 depend from proposed substitute claim 27 and are the same as original claims 10, 13, and 15 except that the claim dependencies have been updated. We have analyzed all limitations of proposed substitute claims 29, 32, and 34 above. *See supra* §§ II.D.7–9. Thus, for the same reasons, we determine Petitioner has shown, by a preponderance of the evidence, that the subject matter of proposed substitute claims 29, 32, and 34 would have been obvious over Sakamoto.

F. Patentability of Proposed Substitute Claims 20, 23–25, 27, 29, 32, and 34 over Sakamoto and Huang

Petitioner contends the subject matter of proposed substitute claims 20, 23–25, 27, 29, 32, and 34 would have been obvious over the combination of Sakamoto and U.S. Patent No. 7,826,968 B2 (Ex. 2011, “Huang”). MTA Opp. 16–24; MTA Sur-reply 10–12. We already have found proposed substitute claims 20, 23–25, 27, 29, 32, and 34 to be unpatentable over Sakamoto, so we do not reach the ground based on Sakamoto and Huang. *See SAS*, 138 S. Ct. at 1359; *Boston Sci.*, 809 F. App’x at 990.

IV. CONCLUSION¹⁰

Petitioner has shown, by a preponderance of the evidence, that claims 1, 4–6, 8, 10, 13, and 15 would have been obvious over Sakamoto. Patent Owner has shown that its motion to amend complies with the statutory and regulatory requirements. Nevertheless, Petitioner has shown, by a preponderance of the evidence, that proposed substitute claims 20, 23–25, 27, 29, 32, and 34 would have been obvious over Sakamoto. Thus, we *deny* Patent Owner’s motion to amend.

¹⁰ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

V. ORDER

Accordingly, it is

ORDERED that claims 1, 4–6, 8, 10, 13, and 15 of the '774 patent are held to be unpatentable;

FURTHER ORDERED that Patent Owner's motion to amend is *denied*; and

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

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 4–6, 8, 10, 13, 15	103(a)	Sakamoto	1, 4–6, 8, 10, 13, 15	
1, 4–6, 8, 10, 13, 15	103(a) ¹¹	Sakamoto, AAPA		
1, 4–6, 8, 10, 13, 15	103(a) ¹²	Sakamoto, Hayasaka		
Overall Outcome			1, 4–6, 8, 10, 13, 15	

¹¹ As explained above, we do not reach this ground. *See supra* § II.E.

¹² As explained above, we do not reach this ground. *See supra* § II.F.

Motion to Amend Outcome	Claims
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment ¹³	20, 23–25, 27, 29, 32, 34
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	20, 23–25, 27, 29, 32, 34
Substitute Claims: Not Reached	

¹³ Although Patent Owner’s motion originally proposed claims to replace dependent claims not challenged in this proceeding (*see* MTA 25–30), Patent Owner later agreed that “only corresponding proposed substitute claims 20, 23-25, 27, 29, 32, and 34 are to be considered in relation to Patent Owner’s Motion to Amend.” MTA Reply 1; *see supra* § III.B.2.

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