

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

LBT IP I LLC,
Patent Owner.

IPR2020-01191
Patent 8,102,256 B2

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

McSHANE, *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)

I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons discussed herein, we determine that Petitioner has shown by a preponderance of the evidence that challenged claims 8–10 of U.S. Patent No. 8,102,256 B2 (Ex. 1001, “the ’256 patent”) are unpatentable.

Patent Owner filed a contingent Motion to Amend to cancel original claims 8–10 and replace them with proposed substitute claims 11–13. For the reasons discussed herein, we deny this motion because Petitioner has established by a preponderance of the evidence that the proposed substitute claims are unpatentable in view of the prior art.

A. *Procedural Background*

Apple Inc. (“Petitioner”) filed a Petition requesting *inter partes* review of claims 8–10 of the ’256 patent, along with the supporting Declaration of Scott Andrews. Paper 1 (“Pet.”); Ex. 1003. LBT IP I LLC (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 8. On March 4, 2021, pursuant to 35 U.S.C. § 314(a), we instituted *inter partes* review based on the following grounds:

Claim(s)	35 U.S.C. § ¹	References/Basis
10	103(a)	Sakamoto ² , Gotoh ³
10	103(a)	Sakamoto, Gotoh, Kulach ⁴
8, 9	103(a)	Sakamoto, Gotoh, Krasner ⁵
8, 9	103(a)	Sakamoto, Gotoh, Krasner, Kulach

Pet. 8; Paper 9 (“Inst. Dec”), 7.

Patent Owner filed a Patent Owner Response (“PO Resp.”). Paper 17. Petitioner filed a Reply (“Pet. Reply”) to the Patent Owner Response, as well as the Supplemental Declaration of Scott Andrews. Paper 25; Ex. 1080. Patent Owner filed a Sur-reply (“PO Sur-reply”). Paper 31.

In addition, Patent Owner filed a contingent Motion to Amend (Paper 16, “Mot.”), which was opposed by Petitioner (Paper 26, “Pet. Mot. Opp.”). At the request of Patent Owner (Mot. 2), we issued Preliminary Guidance to Patent Owner’s Motion to Amend (Paper 28). Patent Owner submitted a Reply in Support of its Motion to Amend (Paper 30, “PO Mot.

¹ 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 effective March 16, 2013. Because the ’256 patent was filed before this date, the pre-AIA versions of §§ 102, 103, and 112 apply.

² Japanese Unexamined Patent Application Publication No. 2004-37116 (published February 5, 2004). Ex. 1004. We refer to the English translation (Ex. 1004) of the original reference herein. Petitioner provides declarations attesting to the accuracy of the translation. *Id.* at 20, 50.

³ U.S. Patent Application No. 2003/0217070 A1, published on November 20, 2003. Ex. 1005.

⁴ U.S. Patent Application No. 2007/0208544A1, published on September 6, 2007. Ex. 1007.

⁵ U.S. Patent No. 6,799,050 B1, filed June 4, 2001, issued September 28, 2004. Ex. 1010.

Reply”), and Petitioner filed a Sur-reply supporting its Opposition (Paper 36, “Pet. Mot. Sur-reply”).

An oral hearing, consolidated with Cases IPR2020-01189 and IPR2020-01192, was conducted on December 9, 2021. A transcript of the hearing is included in the record. Paper 38 (“Tr.”).

B. Related Matters

The parties identify *LBT IP I LLC v. Apple Inc.*, Civil Action No. 1:19-cv-01245-UNA (D. Del.), filed on July 1, 2019 as a related matter. Pet. 71; Paper 3, 2. Petitioner also identifies several petitions filed challenging other patents related to the ’256 patent: IPR2020-01189, IPR2020-01190, IPR2020-01192, and IPR2020-01193. Pet. 71.

C. The ’256 Patent

The ’256 patent is titled “Apparatus And Method For Determining Location And Tracking Coordinates Of A Tracking Device” and issued on January 24, 2012, from an application filed on January 6, 2008. Ex. 1001, codes (22), (45), (54).

The ’256 patent is directed to an apparatus to monitor location coordinates of an electronic tracking device. Ex. 1001, code (57), 3:19–20. The electronic tracking device apparatus includes electronic components such as a transceiver, signal processing circuitry, and an accelerometer. *Id.* at 5:44–47. Figure 1, reproduced below, depicts a schematic of the electronic tracking device.

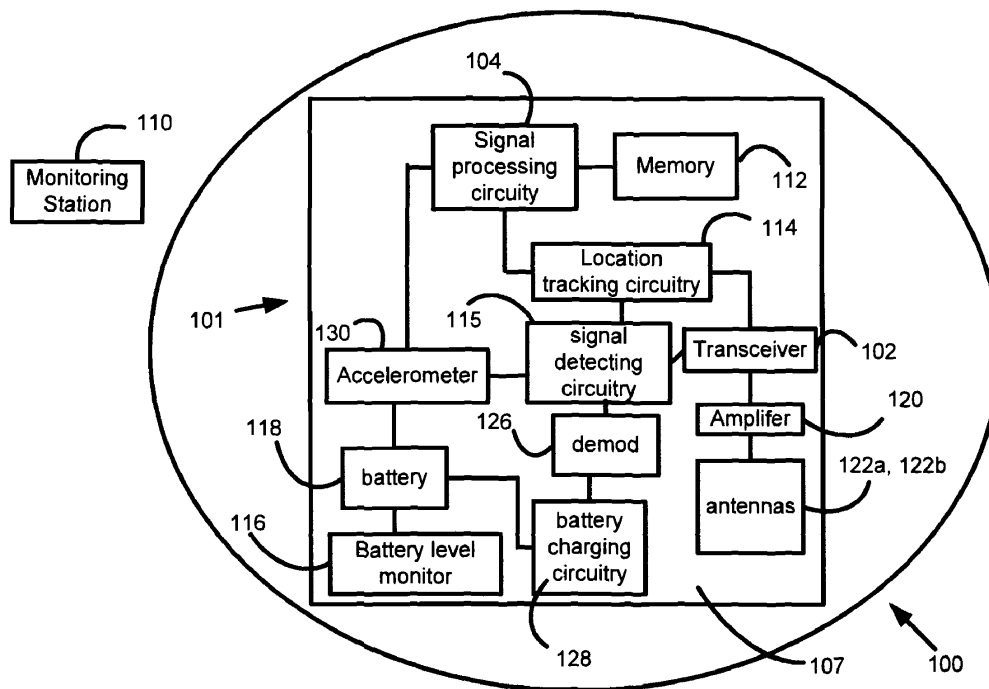


Figure 1

As depicted in the schematic of Figure 1, reproduced above, tracking device 100 contains electronic components 101 such as transceiver 102, signal processing circuitry 104 (e.g., a microprocessor or other signal logic circuitry), and accelerometer 130. Ex. 1001, 5:44–47. Signal processing circuitry 104 may store a first identification code, produce a second identification code, determine location coordinates, and generate a positioning signal that contains location data. *Id.* at 5:56–60. Location tracking circuitry 114 calculates location data received and sends the data to signal processing circuitry 104. *Id.* at 6:6–8. Memory 112 stores operating software and data communicated to and from signal processing circuit 104 and/or location tracking circuitry 114, for example, global positioning system (GPS) logic circuitry. *Id.* at 6:8–11. Signal power levels are detected and measured, and the battery level is detected. *Id.* at 6:11–16.

When a signal level received by the GPS receiver is below a first signal level, portions of GPS circuitry may be placed in a sleep mode to conserve the battery level, and GPS signal acquisition may be resumed when the signal level is above a first signal level. *Id.* at 6:60–7:5. “[W]hen GPS signaling is not practicable, electronic device proximity measurements provide differential location coordinate information to calculate current location coordinate information.” *Id.* at 8:3–6.

Figure 3, reproduced below, is a flowchart illustrating battery conservation for electronic tracking device 100. Ex. 1001, 9:25–26.

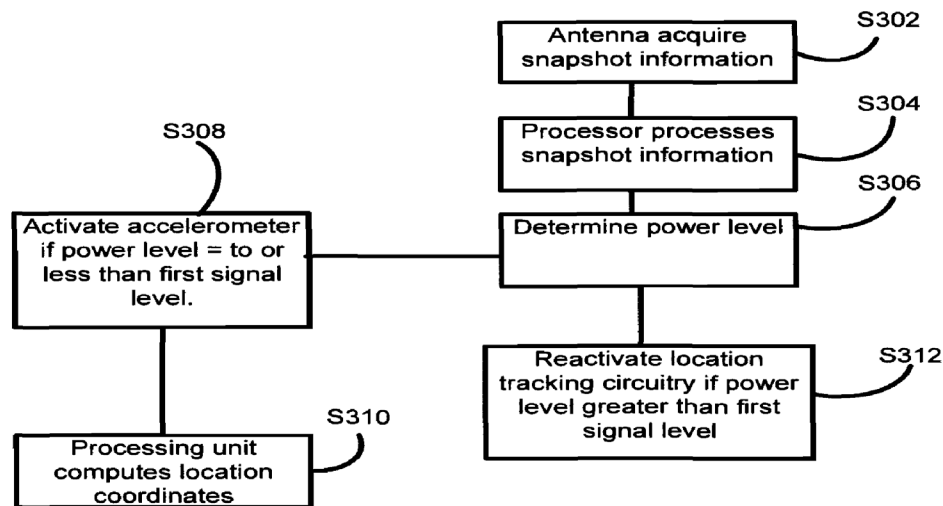


Figure 3

As shown the flow chart of Figure 3, above, antenna 122a associated with electronic tracking device 100 acquires a snapshot of receive communication signal in step 302, including location coordinates data, and processing unit 104 processes the data in step 304. Ex. 1001, 9:28–33. In step 306, processing unit 104 determines a power level of receive communication signal. *Id.* at 9:33–34. In step 308, accelerometer 130 activates if a power level of the receive communication signal is insufficient, and accelerometer

130 may measure acceleration of electronic tracking device 100 at time intervals, with processing unit 104 computing current location coordinates using acceleration measurements at step 310. *Id.* at 9:35–41. In a variation of step 312, upon determining receive communication signal is of sufficient signal strength, accelerometer 130 is deactivated and location tracking circuitry 114 is activated. *Id.* at 9:49–52.

Challenged claims 8, 9, and 10 are independent. These claims of the '256 patent are reproduced below, with bracketed letters added to the limitations for reference purposes.

8. A location monitoring apparatus for an electronic tracking device to track by a monitoring station comprising:

[a] an accelerometer to generate displacement vectors associated with the electronic tracking device;

[b] a signal processor to measure a signal level of a receive communication signal comprising location coordinates information, wherein the accelerometer activates or deactivates based in part of a value of the signal level of the receive communication signal;

[c] a power amplifier to amplify a signal level of at least one of the receive communication signal and a transmit communication signal; and

[d] battery monitor circuitry to measure available battery power and adjust power usage to the power amplifier responsive to available battery power and to a signal level of the receive communication signal.

9. A location monitoring apparatus for an electronic tracking device to track by a monitoring station comprising:

[a] an accelerometer to generate displacement vectors associated with the electronic tracking device;

[b] a signal processor to measure a signal level of a receive communication signal comprising location coordinates information,

wherein the accelerometer activates or deactivates based in part of a value of the signal level of the receive communication signal;

[c] power amplifier circuitry;

[d] location tracking circuitry; and

[e] battery management circuitry to adjust power level applied to the location tracking circuitry and the power amplifier circuitry responsive to the signal level.

10. A location monitoring apparatus for an electronic tracking device powered by a battery to track by a monitoring station comprising:

[a] an accelerometer to generate displacement vectors associated with the electronic tracking device; and

[b] a signal processor to measure a signal level of a receive communication signal comprising location coordinates information; and

[c] a battery power monitor configured to activate and deactivate at least one portion of the electronic tracking device to conserve battery power in response to a signal level of the receive communication signal, wherein the accelerometer activates or deactivates based in part on the signal level of the receive communication signal.

Ex. 1001, 10:61–12:18.

II. ANALYSIS OF PATENTABILITY OF CLAIMS 8–10

A. The Parties' Arguments

In our Decision on Institution, we concluded that the arguments and evidence advanced by Petitioner demonstrated a reasonable likelihood that at least one claim of the '256 patent would have been obvious. Inst. Dec. 10–30. Here, we must consider whether Petitioner has established by a preponderance of the evidence that claims 8–10 of the '256 patent would have been obvious. 35 U.S.C. § 316(e). We previously instructed Patent Owner that “Patent Owner is cautioned that any arguments not raised in the

response may be deemed waived.” Paper 10, 9; *In re NuVasive, Inc.*, 842 F.3d 1376, 1379–82 (Fed. Cir. 2016) (holding patent owner waived an argument addressed in the preliminary response by not raising the same argument in the patent owner response). Additionally, the Board’s Trial Practice Guide states that the Patent Owner Response “should identify all the involved claims that are believed to be patentable and state the basis for that belief.” Consolidated Trial Practice Guide (“TPG”), 66 (Nov. 2019).

Patent Owner has chosen not to address certain arguments and evidence advanced by Petitioner to support its unpatentability contentions. In this regard, the record contains persuasive arguments and evidence presented by Petitioner regarding the manner in which the prior art discloses the corresponding limitations of claims 8–10 of the ’256 patent as well as rationale to combine the references.

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art the time of the invention would have had would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or an equivalent degree, with at least two years of experience in GPS navigation, dead reckoning, portable tracking devices, or related technologies. Pet. 5. Petitioner contends that additional education may substitute for lesser work experience and vice-versa. *Id.* (citing Ex. 1003 ¶ 30).

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995)

(citation omitted). The level of ordinary skill in the art is also reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

In the Institution Decision, we considered the subject matter of the '256 patent, the background technical field, and the prior art, and we agreed with Petitioner's proposed qualifications; however, we deleted the use of the qualifier of "at least" because it introduces vagueness. Inst. Dec. 8–9. Accordingly, we determined that one 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, dead reckoning, portable tracking devices, or related technologies, and that additional education may substitute for lesser work experience and vice-versa. *Id.*

Patent Owner adopted the qualifications identified in the Institution Decision. PO Resp. 3.

In view of the relevant technology and claims of the '256 patent, as well as the technology of the asserted prior art, and we adopt the same qualifications as those identified in the Institution Decision.

*C. Claim Construction*⁶

For petitions filed after November 13, 2018, the Board interprets claim terms in accordance with the standard used in federal district court in a civil action involving the validity or infringement of a patent. 37 C.F.R. § 42.100(b) (2019). Under the principles set forth by our reviewing court,

⁶ This section applies to claim construction related to the original claims 8–10 of the '256 patent. Claim construction issues related to the proposed substitute claims are addressed in Section III.C.1 *infra*.

the “words of a claim ‘are generally given their ordinary and customary meaning,’” as would be understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

Petitioner asserts that no express claim construction is required in order to assess the grounds presented. Pet. 9; *see generally* Pet. Reply. Patent Owner does not present any proposed construction for any claim terms. *See generally* PO Resp.; PO Sur-reply.

In the Institution Decision, we determined that it was not necessary to provide express interpretations of any claim terms. Inst. Dec. 9–10. On the full record, we likewise determine that it is not necessary to provide an express interpretation of any claim terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

D. Alleged Obviousness of Claim 10 Over Sakamoto and Gotoh

Petitioner contends that claim 10 would have been obvious over the combination of Sakamoto and Gotoh. Pet. 12–44; Pet. Reply 10–11. To support its contentions, Petitioner provides explanations as to how Sakamoto

and Gotoh teach each claim limitation and why there is a motivation to combine the references. *Id.* Petitioner also relies upon the Andrews Declaration (Ex. 1003) and the Supplemental Andrews Declaration (Ex. 1080) to support its positions. Patent Owner argues that the prior art does not teach all the claim limitations and Petitioner has not fully supported the rationale to combine the references. PO Resp. 11–19; PO Sur-reply 1–10.

We begin our discussion with a brief summary of Sakamoto and Gotoh, and then address the evidence and arguments presented.

1. Sakamoto (Ex. 1004)

Sakamoto is 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 of the configuration of an embodiment of Sakamoto's system.

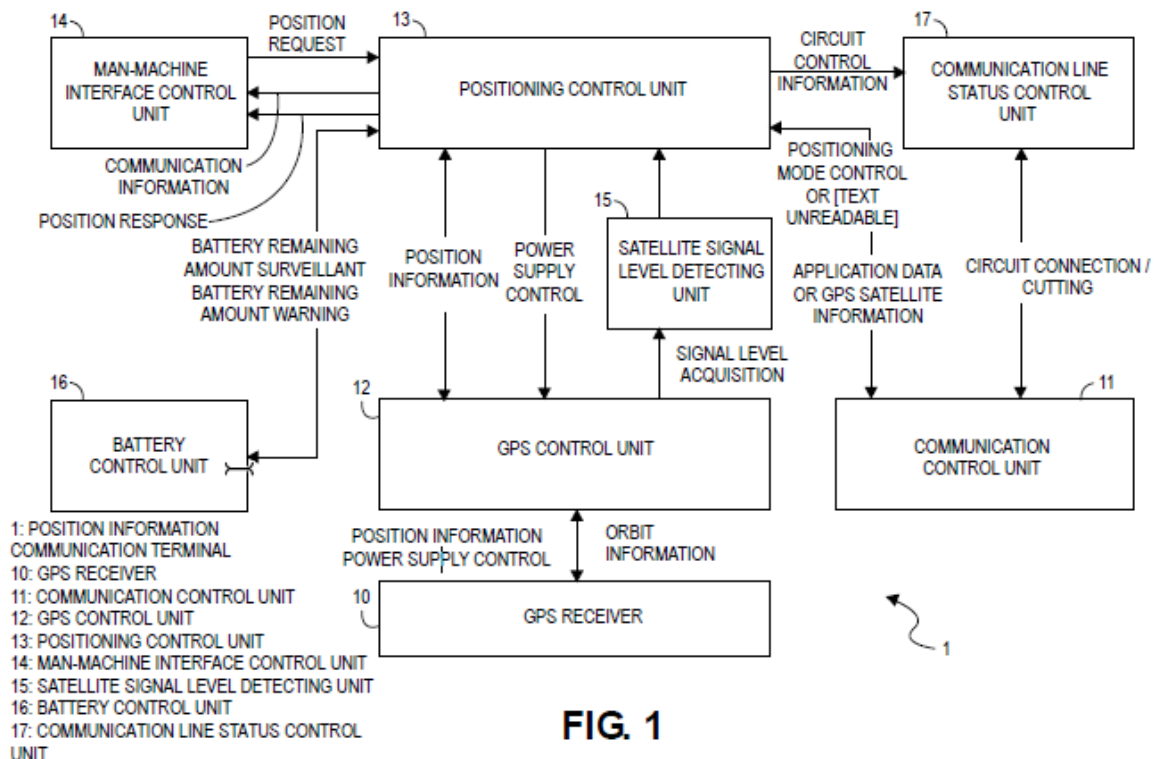


Figure 1, above, depicts the position information communication terminal 1 which includes GPS receiver 10, positioning control unit 13, communication control unit 11 for mobile communications, man-machine interface control unit 14, which is an interface means with a terminal user, and battery control unit 16. Ex. 1004 ¶ 19. 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.* Terminal 1 also has satellite signal level detector 15 that detects a level of the GPS signal received by GPS receiver 10. *Id.* ¶ 50. When the satellite signal level received by terminal 1 is low such that positioning is not possible, power consumption can be reduced by stopping the position search. *Id.*

2. Gotoh (Ex. 1005)

Gotoh is directed to a positional information management system that includes a mobile terminal and server. Ex. 1005 ¶ 9. Figure 1 of Gotoh, which shows a schematic diagram of the system, is reproduced below.

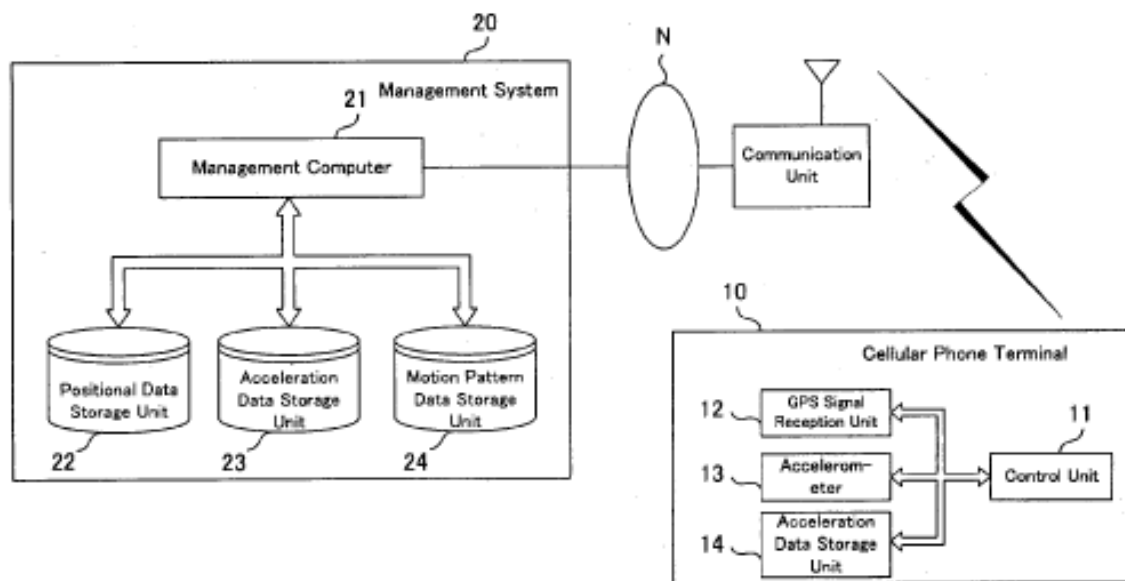


Figure 1, above, depicts a schematic diagram of Gotoh's system, with cellular phone terminal 10 acting as the mobile terminal, which includes

GPS signal reception unit 12, accelerometer 13, acceleration data storage unit 14, and control unit 11 for controlling the terminal. Ex. 1005 ¶ 51. Control unit 11 controls GPS signal reception unit 12 and accelerometer 13, and has a function for performing wireless communication. *Id.* ¶ 52. Management system 20 exchanges information with the cellular phone terminal 10 via a communication system. *Id.* ¶ 56. A communication system includes a wireless base station for sending and receiving predetermined information to and from cellular phone terminal 10, with the communication system specifying the position of cellular phone terminal 10 based on GPS signals sent from cellular phone terminal 10. *Id.* ¶ 54. When cellular phone terminal 10 cannot receive GPS signals, cellular phone terminal 10 starts measuring and storing acceleration data. *Id.* ¶¶ 66, 81.

3. Analysis

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective indicia of nonobviousness.⁷ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁷ No evidence of objective indicia of nonobviousness has been presented by Patent Owner. *See generally* PO Resp.

a. Claim 10

Petitioner asserts that the combination of Sakamoto and Gotoh teaches all the limitations of claim 10, and one of ordinary skill in the art would have been motivated to combine the asserted prior art references. *See* Pet. 12–44; Pet. Reply 10–11.

1) Petitioner’s Contentions

i. Preamble

The preamble of claim 10 recites “[a] location monitoring apparatus for an electronic tracking device powered by a battery to track by a monitoring station.” Ex. 1001, 12:5–7. Petitioner cites Sakamoto in combination with Gotoh for the teaching of the location monitoring apparatus of the preamble. Pet. 21. More specifically, Petitioner asserts that Sakamoto teaches a GPS positioning system with a position information communication terminal that is tracked by a position management/positioning server 2. *Id.* (citing Ex. 1004 ¶¶ 18–19). Petitioner argues that “Sakamoto’s GPS receiver 10, GPS control unit 12, positioning control unit 13, signal level detection unit 15, and battery control unit 16 . . . in combination with the accelerometer taught by Gotoh, provide for location monitoring.” *Id.* at 22. Petitioner contends that Sakamoto’s GPS receiver 10 calculates a position of the position information communication terminal 1, and Gotoh’s accelerometer enables determining a distance traveled when GPS signals are unavailable, so these components constitute the claimed “location monitoring apparatus” and are the “electronic tracking device,” as claimed. *Id.* (citing Ex. 1004 ¶ 23; Ex. 1005, code (57), ¶ 90).

ii. Limitation 10[a]

Limitation 10[a] recites “an accelerometer to generate displacement vectors associated with the electronic tracking device.” Ex. 1001, 12:8–9. For this limitation, Petitioner acknowledges that Sakamoto does not expressly teach an accelerometer, but argues that portable devices utilizing both GPS-based and accelerometer-based position determinations (such as Gotoh’s) were well known in the art. Pet. 25. Petitioner asserts that Gotoh teaches an accelerometer to generate displacement vectors. *Id.* at 25–27 (citing Ex. 1005, code (57), ¶¶ 59, 64, 66–67, 81–82, 84, Figs. 1, 2; Ex. 1003 ¶¶ 135–137). Mr. Andrews testifies that when force is applied to an object at rest, it accelerates and moves, i.e., it is displaced. Ex. 1003 ¶ 137. Mr. Andrews testifies that an accelerometer, like that of Gotoh, measures the acceleration that causes displacement, and by measuring acceleration the displacement of the object is also measured. *Id.* ¶ 138. Mr. Andrews further testifies that a person of ordinary skill in the art would have known that an accelerometer is mounted in a fixed orientation within a cellular phone terminal, and that by measuring acceleration with this orientation, Gotoh teaches an accelerometer that generates displacement vectors associated with the electronic tracking device. *Id.* ¶ 139.

Petitioner contends that one of ordinary skill in the art would have been motivated to combine Sakamoto and Gotoh. Pet. 13–20. Petitioner argues that Sakamoto and Gotoh are analogous art to the ’256 patent and that one of ordinary skill would have been motivated to combine Gotoh’s accelerometer with Sakamoto’s system that uses GPS for determining a position. Pet. 13–14 (citing Ex. 1003 ¶¶ 114–123). Petitioner contends that the use of accelerometers for location tracking of a device, in particular

when GPS signals are unavailable, was well-known. *Id.* (citing Ex. 1003 ¶¶ 46–57). Petitioner contends that using an accelerometer to supplement a GPS receiver would have been the use of a known technique to improve a similar device in the same way and would have been an improvement to Sakamoto’s device. *Id.* at 14 (citing Ex. 1003 ¶ 120). Petitioner further alleges that it would have been simple to add an accelerometer to Sakamoto’s terminal, and the addition of Gotoh’s accelerometer combined with Sakamoto’s system would have performed the same function of supplemental location tracking to measure displacements with an accelerometer when GPS signals cannot be received. *Id.* at 15 (citing Ex. 1005 ¶ 81).

Petitioner argues that there would have been a reasonable expectation of success in adding the accelerometer of Gotoh in the system of Sakamoto. Pet. 16. Petitioner asserts that accelerometers were readily available, inexpensive, and ready for use and integration with larger electronic devices. *Id.* (citing Ex. 1001, 6:39–44; Ex. 1031, 1; Ex. 1003 ¶ 122). Petitioner further asserts that it also would have been obvious to only use the accelerometer data when such functionality was needed due to poor GPS signal reception, as taught by Gotoh. *Id.* (citing Ex. 1003 ¶ 123).

iii. Limitation 10[b]

Limitation 10[b] recites “a signal processor to measure a signal level of a receive communication signal comprising location coordinates information.” Ex. 1001, 12:10–12. Petitioner asserts that Sakamoto teaches “a signal processor” that detects a level of the GPS signal received by the GPS receiver. Pet. 28 (citing Ex. 1004 ¶¶ 8, 19, 50, claim 4). More specifically, Petitioner refers to Sakamoto’s satellite signal level detecting

unit 15 that “monitor[s] the signal level from the GPS satellite during the measurement time specified in the satellite signal level request message” and calculates an “average value of the signal level.” *Id.* (citing Ex. 1005 ¶ 37). Petitioner argues that it was well-known that “the GPS satellite signal includes information, i.e., time offsets associated with the location coordinates of the receiver, that the GPS receiver uses to determine position.” *Id.* at 29 (citing Ex. 1003 ¶¶ 33–40, 144). Petitioner asserts that a person of ordinary skill in the art “would have understood Sakamoto teaches that the GPS satellite signal level that is monitored is a ‘receive communication signal comprising location coordinates information.’” *Id.* at 30 (citing Ex. 1003 ¶¶ 143–144).

iv. Limitation 10[c]

Limitation 10[c] recites:

a battery power monitor configured to activate and deactivate at least one portion of the electronic tracking device to conserve battery power in response to a signal level of the receive communication signal, wherein the accelerometer activates or deactivates based in part on the signal level of the receive communication signal.

Ex. 1001, 12:13–18.

Petitioner argues that Sakamoto teaches a battery power monitor (i.e., the battery control unit 16, positioning control unit 13, and GPS control unit 12). Pet. 33. Petitioner asserts that Sakamoto’s battery control unit 16 notifies positioning control unit 13 of the remaining battery amount by sending a remaining battery amount warning to positioning control unit 13. *Id.* (citing Ex. 1004 ¶¶ 10, 29). Petitioner contends that in Sakamoto

positioning control unit 13 sets the positioning mode in response to a signal level of the GPS satellite signal received by GPS receiver 10. *Id.*

Petitioner argues that Sakamoto teaches activating and deactivating the GPS receiver to conserve power and in response to a signal level. Pet. 30–44. Petitioner asserts that Sakamoto’s GPS receiver monitors the GPS satellite signal and then, depending on the signal level, changes its mode of operation. *Id.* at 30–32 (citing Ex. 1004 ¶¶ 24–25, 27, 37–38, 45, 50). Mr. Andrews testifies that the three possible operational modes of Sakamoto are: (1) high sensitivity (poor signal); (2) normal mode (good signal); and (3) stop-position searching mode (GPS signal too low to perform positioning operations). Ex. 1003 ¶ 152 (citing Ex. 1004 ¶¶ 5, 24, 27, 38, 50).

Petitioner asserts that Sakamoto teaches activating and deactivating at least one portion of the mapped electronic tracking device in response to a signal level of the received communication signal to reduce power consumption. Pet. 31. Petitioner refers to Sakamoto’s teaching that “the GPS receiver cyclically monitors the GPS satellite signal level according to a ‘measurement time.’” *Id.* (citing Ex. 1004 ¶ 37). Petitioner asserts that “Sakamoto teaches transitioning to the normal mode (if not already in the normal mode)” in situations where “the GPS signal is ‘high.’” *Id.* (citing Ex. 1004 ¶ 27). Petitioner further contends that “when the GPS signal is ‘equal to or lower than a predetermined threshold value,’ such that ‘positioning cannot be performed,’ the ‘position search may be stopped.’” *Id.* (citing Ex. 1004 ¶ 38).

Mr. Andrews testifies that deactivating the GPS receiver, i.e., stopping position searching, is known to reduce power consumption. Ex. 1003 ¶¶ 146–147. Petitioner additionally refers to Sakamoto’s teaching that

“power consumption can be reduced by stopping the position search when positioning is not possible.” Pet. 31–32 (citing Ex. 1004 ¶ 50).

Petitioner argues that Sakamoto teaches activating and deactivating the GPS receiver by performing signal level detection during a set measurement time. Pet. 34 (citing Ex. 1003 ¶¶ 151–157; Ex. 1004 ¶¶ 20, 37, Figs. 6, 7). Petitioner asserts that “at the cycle set in advance,” terminal 1 repeats signal level detection via unit 15 and a positioning mode is set. *Id.* at 36 (citing Ex. 1003 ¶¶ 151–152; Ex. 1004 ¶¶ 37–38). According to Petitioner, “the positioning mode control unit 22 ‘sends a positioning control message (satellite signal level request message),’” and the positioning control unit then “causes the satellite signal level detection unit 15 to monitor the signal level from the GPS satellite” during this cycle. Pet. Reply 3–4 (citing Ex. 1003 ¶¶ 146–157; Ex. 1004 ¶¶ 37–38). Petitioner contends that in Sakamoto the satellite signal level response is sent to position management/positioning server 2, and the positioning mode control unit 22 reads it and “determines the required positioning mode based on the satellite signal level, including whether the signal level is above ‘the predetermined threshold value.’” *Id.* at 4 (citing Ex. 1004 ¶ 38). Mr. Andrews testifies that Sakamoto teaches a cycle such that positioning operations are performed more than once over a period of time and “it would have been non-sensical to design Sakamoto’s system such that positioning would only have been performed once.” Ex. 1003 ¶ 152.

Petitioner refers to Sakamoto’s disclosure that position searching would be stopped (stop-position mode) if the signal level detected is equal to or lower than a predetermined threshold value. *Id.* at 35–36 (citing Ex. 1003 ¶ 151; Ex. 1004 ¶¶ 20, 38). Mr. Andrews testifies that,

in instances where the operation mode was previously in a stop-position searching mode because the signal level was equal to or lower than a predetermined threshold, and the subsequent detected signal level is good (e.g., above a threshold value, K2), then a POSITA [person of ordinary skill in the art] would have understood GPS control unit 12 instructs GPS receiver 10 to begin position searching.

Ex. 1003 ¶ 154 (citing Ex. 1004 ¶ 27). Mr. Andrews further testifies that a person of ordinary skill would have considered a location tracking device “useless” if it transitioned to stop-positioning mode when the signal level was low, but did not transition to a positioning mode by activating the GPS when the signal was high enough. *Id.* ¶ 155.

Petitioner argues that Sakamoto, as modified by Gotoh, teaches that “the accelerometer activates or deactivates based in part on the signal level of the receive communication signal.” Pet. 39–44. Petitioner contends that Sakamoto teaches a “predetermined threshold value” of the satellite signal level when the position search may be stopped, and Gotoh teaches starting acceleration measurements when the GPS signals cannot be acquired and, conversely, stopping acceleration measurements when the GPS signals are again available. *Id.* at 39–40 (citing Ex. 1004 ¶¶ 38, 50; Ex. 1005 ¶¶ 66–67). Petitioner asserts that in the Sakamoto system, as modified by Gotoh, the system starts measuring acceleration when GPS signals cannot be received. *Id.* at 39 (citing Ex. 1003 ¶¶ 161–164). Further, Petitioner argues that because Gotoh teaches the terminal “finishes measuring the acceleration” when the terminal is again able to receive GPS signals, a person of ordinary skill in the art would have understood the accelerometer is deactivated based

on the GPS signal. *Id.* at 43 (citing Ex. 1003 ¶¶ 163–164; Ex. 1005 ¶¶ 67–68).

Petitioner asserts that Sakamoto and Gotoh are both analogous art to the '256 patent. Pet. 13. Petitioner argues, and Mr. Andrews provides supporting testimony, that one of ordinary skill in the art would have been motivated to combine Gotoh's accelerometer with Sakamoto's system. *Id.* (citing Ex. 1003 ¶¶ 114–123). Mr. Andrews testifies as early as 1991 it was known that inertial location tracking using accelerometers was used as supplemental location tracking to satellite based location tracking (i.e., GPS). Ex. 1003 ¶¶ 47–57. Petitioner contends that using an accelerometer to supplement a GPS receiver would have been use of a known technique, and using Gotoh's accelerometer to supplement a GPS reception unit, that is, Sakamoto's GPS receiver, in the same way would have been an improvement to Sakamoto's device. Pet. 14 (citing Ex. 1003 ¶ 120).

2) Patent Owner's Contentions

Patent Owner asserts that Petitioner fails to meet its burden to demonstrate that Sakamoto teaches limitation 10[c], "a battery power monitor configured to activate and deactivate at least one portion of the electronic tracking device to conserve battery power in response to a signal level of the receive communication signal." PO Resp. 11–17. Patent Owner does not present arguments directed to the other limitations of claim 10. *See generally id.* Patent Owner notes that Petitioner relies upon the stop-position mode of Sakamoto to teach this limitation. *Id.* at 11–12 (citing Pet. 33–39). Patent Owner further notes Mr. Andrews' testimony that Sakamoto's GPS receiver 10 is the only component that receives GPS satellite signals. *Id.* at 12, 14 (citing Ex. 2003, 14:5–16:2, 20:1–4, 23:10–

11). As such, Patent Owner contends that if power has been cut off to the GPS receiver when the “portion of the electronic tracking device” has been deactivated, “and GPS receiver 10 is the only component in Sakamoto that receives the GPS satellite signal,” then in Sakamoto there can be no activation of the GPS receiver as required by the claim limitation. *Id.* at 12–13. Patent Owner also disputes Petitioner’s suggestion that Sakamoto’s signal level detection unit 15 separately detects signal levels based on Sakamoto’s statement that unit 15 is used “for detecting the level of the GPS satellite signal ***received by the GPS receiver 10*** via the GPS control unit 12.” *Id.* at 13 (citing Pet. 36; Ex. 1003 ¶ 152; Ex. 1004 ¶¶ 19, 27).

Patent Owner also disputes Mr. Andrews’ testimony regarding the reactivation of Sakamoto’s GPS receiver from stop-position mode based on a signal level. PO Resp. 14–16 (citing, *inter alia*, Ex. 1003 ¶ 152). Patent Owner asserts that, in contrast to this testimony, Sakamoto teaches manual reactivation of the GPS receiver after it has been put into stop-position mode. PO Resp. 15–16 (citing Ex. 1004 ¶ 20). Patent Owner contends that Mr. Andrews’ testimony is conclusory, unsupported, and speculative and cannot be a basis for a finding of unpatentability. PO Sur-reply 6–8 (citing Ex. 2003, 23:10–24:3).

Patent Owner argues that, in light of the claims and specification of the ’256 patent, the accelerometer recited in limitation 10[c] “must be able to be activated and deactivated in response to the strength level of a signal.” PO Resp. 17. Patent Owner asserts that Petitioner has not met its burden to show that that the accelerometer in Petitioner’s proposed combination of

Sakamoto and Gotoh⁸ is capable of being deactivated in response to a signal level. *Id.* at 17–18. Regarding Mr. Andrews’ testimony that a person of ordinary skill would have combined Gotoh’s accelerometer with Sakamoto “to start recording acceleration data when a cellular phone terminal cannot receive GPS signals,” Patent Owner argues that he “offers no opinion as to why a POSITA would combine Gotoh with Sakamoto in any other context.” *Id.* at 18 (citing Ex. 1003 ¶¶ 114–123). Patent Owner also argues that Mr. Andrews does not explain “how or why a POSITA would combine Gotoh’s GPS capabilities with Sakamoto, which already includes GPS capabilities.” *Id.* Patent Owner asserts that the proposed combination of Sakamoto and Gotoh cannot disclose deactivating the accelerometer in response to a signal level because the stop-position mode is the only time that Gotoh’s accelerometer is used. *Id.* at 18–19.

3) Analysis

We have reviewed Petitioner’s arguments and evidence and determine that Petitioner provides persuasive evidence that the combination of Sakamoto and Gotoh teaches the preamble⁹ and the limitations of claim 10 and provides a persuasive rationale to combine the references.

Patent Owner’s arguments are directed only to the adequacy of Petitioner’s showing as to limitation 10[c]. For the teaching of “activate . . . one portion of the electronic tracking device . . . in response to a signal level

⁸ Patent Owner also asserts that the showing with respect to a combination of the asserted prior art with Kulach is deficient. PO Resp. 16–18. We address those issues in Section II.E.2 *infra*.

⁹ We make no specific determination as to whether the preamble of claim 10 is limiting.

of the receive communication signal,” Petitioner relies upon paragraphs 37 and 38 of Sakamoto (Pet. 30; Pet. Reply 3–4), which state:

[0037] *Further, at the cycle set in advance in the position information database 25, as shown in the format in FIG. 6, the positioning mode control unit 22 in the position management / positioning server 2 sends a positioning control message (satellite signal level request message) comprising a search terminal address, a server address, a message identifier, and application data of the measurement time via the communication control unit 21. In the position information communication terminal 1 that has received this satellite signal level request message, the positioning control unit 13 causes the satellite signal level detection unit 15 to monitor the signal level from the GPS satellite during the measurement time specified in the satellite signal level request message, and as the calculation result of the average value of the signal level, as shown in the format in FIG. 7, a positioning control message (satellite signal level response message) . . . is returned to the position management / positioning server 2 via the communication control unit 11.*

[0038] *When the position management / positioning server 2 receives the satellite signal level response message, the positioning mode control unit 22 reads out the signal level from each satellite from the satellite signal level response When the positioning mode control unit 22 determines that the high sensitivity positioning mode is required when the signal level value is equal to or lower than a predetermined threshold value, it sends a request to communication control unit 21 for the position search request message including positioning mode information designating the positioning operation of the GPS receiver 10 of the position information communication terminal 1 as the high sensitivity*

positioning mode to be transmitted to the corresponding position information communication terminal 1; if it is determined that the normal sensitivity positioning mode is required when the signal level value is equal to or higher than a predetermined threshold value, it sends a request to communication control unit 21 for the position search request message including positioning mode information designating the positioning operation of the GPS receiver 10 of the position information communication terminal 1 as the normal sensitivity positioning mode to be transmitted to the corresponding position information communication terminal 1. If it is determined that the positioning cannot be performed when the signal level value is equal to or lower than a predetermined threshold value, the position search may be stopped.

Ex. 1004 ¶¶ 38–39 (emphases added).

Based on this disclosure, Petitioner asserts, and we agree, that Sakamoto teaches activating and deactivating the GPS receiver by performing signal level detection during a set measurement time. Pet. 31, 34–36. Mr. Andrews testifies that Sakamoto teaches the use of the timed cycle such that a person of ordinary skill in the art would have understood that an appropriate mode of operation is selected based on the detected signal level. Ex. 1003 ¶ 151. Petitioner also refers to Sakamoto’s disclosure that position searching would be stopped (stop-position mode) if the signal level detected is equal to or lower than a predetermined threshold value. Pet. 35 (Ex. 1004 ¶ 38). Mr. Andrews additionally testifies that if the GPS receiver was previously in the stop-position searching mode and a subsequently-received GPS signal level is good (i.e., above a threshold value), then a person of ordinary skill in the art would have understood that

GPS control unit 12 instructs GPS receiver 10 to begin position searching. Ex. 1003 ¶ 154 (citing Ex. 1004 ¶ 27).

Based on the weight of the evidence, we are persuaded by Petitioner's showing regarding the activation of Sakamoto's GPS receiver from a stop-position mode.

Patent Owner argues that Mr. Andrews' testimony is insufficient and incorrect regarding Sakamoto's teaching on reactivation based on detected signal levels, and instead contends that Sakamoto teaches manual reactivation after it was put in stop-position mode. PO Resp. 14–16 (citing Ex. 1004 ¶ 20). Although Sakamoto may teach manual reactivation from stop-position mode, this does not undermine Petitioner's persuasive showing that a person of ordinary skill in the art considering Sakamoto would have known to activate GPS receiver 10 from stop-position mode based on a sufficient signal level. More specifically, Petitioner relies upon the disclosures of paragraphs 38 and 39 to support its assertion that in Sakamoto the satellite signal level detection unit monitors the signal level from the GPS satellite on a preset periodic cycle, and based on the measured signal level, the positioning mode is set. *See* Pet. 31, 33–36; Ex. 1003 ¶¶ 146–155.

Petitioner also asserts that in Sakamoto, the positioning mode may be changed based on a comparison between a measured signal level and various thresholds. Pet. 33–34. More specifically, Mr. Andrews testifies that when the operation mode was previously in a normal mode or high mode and the subsequent detected signal level is equal to or lower than a predetermined threshold, GPS control unit 12 instructs GPS receiver 10 to stop position searching (deactivate) to conserve power. Ex. 1003 ¶ 154. Conversely, Mr. Andrews testifies that when the operation mode was previously in a

stop-position “and the subsequent detected signal level is good (e.g., above a threshold value, K2), then a [person of ordinary skill in the art] would have understood that GPS control unit 12 instructs GPS receiver 10 to begin position searching” (activate). *Id.* Mr. Andrews explains that, because of changing signal conditions due to different factors, it would have not have made sense or have been useful to design the GPS positioner to set a system once and never transition out of it. *Id.* ¶¶ 152, 155. Mr. Andrews acknowledges that Sakamoto teaches a manual mode, but further testifies that Sakamoto also teaches the use of the automatic cycle to check signal levels for changing modes. *Id.* ¶ 152.

As identified above, Sakamoto discloses at least that periodic checking of signal levels is performed at a cycle set in advance, with the comparison of the detected signal level value to predetermined threshold values then used to set positioning modes.¹⁰ Ex. 1004 ¶¶ 37, 38. This disclosure provides support for Mr. Andrews’ testimony that a person of skill would have understood that, based on the detected signal level checked in a cycle, the operational mode is determined. Ex. 1003 ¶ 152. More specifically, Sakamoto’s disclosures support Mr. Andrews’ testimony that in resetting an operation mode, the mode could be changed to a stop-position mode from a normal mode or high mode and to a normal mode or high mode from a stop-position mode, depending on signal level. *See id.* ¶ 154. The testimony directed to moving from a stop-position mode to a positioning mode is further explained by Mr. Andrews’ rationale that a person of

¹⁰ Petitioner asserts, and we agree, that Sakamoto’s teachings on the periodic checking of GPS signals align with similar disclosures in the ’256 patent. *See* Ex. 1001, 6:63–66, 9:41–49; Pet. Reply 12.

ordinary skill in the art would have understood that signal conditions can change based on location and environmental conditions, so it would not have not made sense or have been useful for Sakamoto to set a mode once and then never change it. Ex. 1003 ¶¶ 152, 155; Ex. 2003, 23:21–24:10.

Although Sakamoto may not explicitly identify moving out of the stop-position mode as a result of the cyclic signal level checking, the issue is not whether there is express disclosure in the reference—it is whether the claimed invention as a whole would have been obvious to a person having ordinary skill in the art to which the claimed invention pertains. *See* 35 U.S.C. § 103. Thus, we accord significant weight to Mr. Andrews’ understanding of Sakamoto’s teachings in the view of one of skill of the art regarding its disclosure of periodic checking of signal levels that is used to set positioning modes. We further credit the additional rationale provided by Mr. Andrews as to why one of skill in the art would have not set a stop-position mode and not moved out of it, that is, signal conditions can change based on environmental conditions. *See* Ex. 1003 ¶ 152; *KSR*, 550 U.S. at 418 (“a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”); *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). Moreover, Patent Owner’s arguments disputing Mr. Andrews’ testimony on an ordinarily skilled artisan’s understanding of Sakamoto are attorney argument only and are unsupported by any record evidence. These attorney arguments are entitled to little, if any, weight. *See In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (explaining that attorney arguments and conclusory statements that are unsupported by factual evidence are entitled to little probative value). Accordingly, Petitioner has provided persuasive evidentiary support

that, in the view of a person of ordinary skill in the art, Sakamoto teaches activating GPS receiver 10 from stop-position searching mode when a subsequently detected signal level is above a threshold value.

We turn to Patent Owner's argument regarding Mr. Andrews' testimony that Sakamoto's GPS receiver 10 is the only component that receives GPS satellite signals, and when this is deactivated (in stop-position mode), there can be no activation of the GPS receiver as required by the claim limitation in Sakamoto. PO Resp. 12–14 (citing Ex. 2003, 14:5–16:2, 20:1–4, 23:10–11). We do not agree with this argument because it does not accurately represent Mr. Andrews' testimony on Sakamoto's GPS receiver operation when cyclically checking signal levels.

As discussed above, Sakamoto discloses performing signal level detection on a cyclic basis, and then comparing the measured signal to thresholds to determine the operational positional mode to be set. *See* Ex. 1004 ¶¶ 24–25, 27, 37–38, 45, 50; Pet. 36. Depending on the positional operational mode determined, GPS receiver operation will be set to normal mode, high mode, or stop-position mode. Ex. 1004 ¶¶ 5, 24, 27, 38, 50.

Mr. Andrews' testimony reflects the distinction between GPS receiver operation when determining signal level and GPS receiver operation when it is performing position searching. More specifically, Mr. Andrews testifies that in Sakamoto, portions of the GPS receiver would be turned on, at the set cycle time, to measure the signal level. Ex. 1080 ¶ 5. Mr. Andrews also testifies that on a periodic basis, at least a portion of the GPS receiver that checks the level of the GPS signals would be turned on, and if the signal level is above the stop-position mode threshold, the GPS receiver would be turned on for position searching, but if the level of the signal level is below

the stop-position mode threshold the GPS receiver would stop position searching. *See* Ex. 1003 ¶ 154; Ex. 2003, 20:23–21:20, 25:1–10, 28:9–16, 32:16–33:15, *see also id.* at 19:8–20:22. Patent Owner’s argument that Sakamoto’s GPS receiver 10 cannot be activated from stop-position mode in response to a signal level measurement disregards Mr. Andrews’ testimony on GPS receiver operation during cyclic signal detection.

Patent Owner further contends that Mr. Andrews’ testimony on GPS receiver operation is conclusory, unsupported, and speculative. PO Sur-reply 6–8. Although Mr. Andrews acknowledges that Sakamoto does not provide specifics on GPS receiver operation when checking signal levels, his testimony is that, in the view of one of ordinary skill in the art, portions of the GPS receiver would be periodically turned on for signal checking in order to reduce power consumption.¹¹ Ex. 1080 ¶ 5; Ex. 2003, 19:8–20:22, 23:10–24:10, 32:16–33:14, 34:12–35:4, *see also id.* at 21:7–11–22:6. We credit this testimony because it is consistent with Sakamoto’s disclosure that signal levels are periodically checked. *See* Ex. 1004 ¶¶ 37, 38. Further, Patent Owner attempts to counter Petitioner’s showing with only attorney argument; in our view, this does not undermine Mr. Andrews’ testimony about how an ordinarily skilled artisan would have interpreted Sakamoto.

We turn to Patent Owner’s arguments directed to accelerometer operation. PO Resp. 17–19. Patent Owner argues that Petitioner’s proposed combination of Sakamoto and Gotoh is incapable of teaching that the accelerometer is deactivated in response to a signal when Sakamoto’s GPS

¹¹ Mr. Andrews testifies that, in order to check the signal level, at least the radio part of the GPS receiver would be need to be turned on briefly to check the signal level. Ex. 2003, 19:16–25.

receiver is inoperable. *Id.* This argument is similarly based on the issue regarding the activation/deactivation of the electronic tracking device in the stop-position mode, and we do not agree with this argument for the reasons discussed above. Patent Owner also argues that Mr. Andrews does not offer an opinion on how or why a person of ordinary skill in the art would have combined Gotoh's GPS capabilities with Sakamoto. PO Resp. 18. But Petitioner relies on Gotoh only for its disclosures related to accelerometer and not on its teachings related to GPS capabilities. Pet. 39–44.

Patent Owner further asserts that Mr. Andrews offers no opinion as to why a person of ordinary skill would have combined Gotoh with Sakamoto, other than “to start recording acceleration data when a cellular phone terminal cannot receive GPS signals.” PO Resp. 18 (quoting Ex. 1003 ¶ 115). We do not agree with this argument. Mr. Andrews testifies that modifying Sakamoto's system with Gotoh's accelerometer would avoid “wasting processing resources and unnecessarily using battery power” by using the accelerometer instead of the GPS when GPS signals reception is poor. Ex. 1003 ¶ 123. Thus, the basis of the motivation for the combination stems from advantages of accelerometer use in low GPS signal conditions. In addition, Petitioner relies upon Gotoh's express teaching of stopping acceleration measurements when the GPS signals are again available. Pet. 43; Ex. 1003 ¶ 163; Ex. 1005 ¶ 67 (“the cellular phone terminal 10 finishes measuring the acceleration in a case where the cellular phone terminal 10 becomes able to receive GPS signals.”). Thus, we are persuaded by Petitioner's showing because Gotoh's use of an accelerometer when GPS signals are poor complements and is consistent with Sakamoto's teachings of stopping GPS positioning in such conditions, particularly when

considering Sakamoto's stated goal of reducing power consumption. Gotoh's express teaching of restarting GPS positioning when GPS signals again become available likewise reinforces the propriety of Petitioner's proposed combination.

Accordingly, we determine that Petitioner has provided persuasive evidence that the combination of Sakamoto and Gotoh teaches limitation 10[c].

4) Conclusion for Claim 10

On the full record, Petitioner has established by a preponderance of the evidence that claim 10 would have been obvious over the combination of Sakamoto and Gotoh.

E. Alleged Obviousness of Claim 10 Over Sakamoto, Gotoh, and Kulach

Petitioner contends that claim 10 would have been obvious over Sakamoto, Gotoh, and Kulach. Pet. 45–48. To support its contentions, Petitioner provides explanations as to how Sakamoto, Gotoh, and Kulach teach each claim limitation and why there is a motivation to combine the references. *Id.* Petitioner also relies upon the Andrews Declaration (Ex. 1003). Patent Owner argues that Petitioner fails to explain how or why the accelerometer of Kulach in the proposed combination with Sakamoto-Gotoh would stop being used in response to a signal level as required by the claim. PO. Resp. 19.

We begin our discussion with a brief summary of Kulach, and then address the evidence presented.

1. Kulach (Ex. 1007)

Kulach teaches a portable tracking apparatus, which includes a GPS receiver and an accelerometer. Ex. 1007 ¶¶ 23–26, 61, 88, Figs. 5–9. In Kulach, the portable tracking device determines motion parameters, including acceleration, velocity, and total distance. *Id.* ¶ 54. Kulach discloses that power usage can be controlled by disabling components, including accelerometer 12, “when not in use to achieve optimum system power consumption and functionality.” *Id.* ¶¶ 83, 90.

2. Analysis

Petitioner contends that, to the extent that Gotoh does not teach “the accelerometer activates or deactivates” limitation of claim 10, Kulach teaches that limitation. Pet. 45. To support its contentions, Petitioner applies the prior art mappings from the Sakamoto–Gotoh ground and adds analysis based on Kulach for teaching the accelerometer activation/deactivation limitation. *Id.*

Petitioner cites to Kulach’s portable apparatus 10 including sensor unit 32, which has sensors 12, i.e., one or more accelerometers 12. Pet. 45 (citing Ex. 1007 ¶ 79, Fig. 5). Petitioner contends that Kulach teaches automatically disabling the sensor unit when not in use to achieve optimum system power consumption. *Id.* at 46 (citing Ex. 1007 ¶ 83). Petitioner also contends that Kulach’s apparatus disables most of its sensors when not in use, but enables one or more accelerometers only enough to maintain context awareness. *Id.* at 46–47 (citing Ex. 1007 ¶ 90). As such, Petitioner asserts that one of ordinary skill in the art would have understood that Kulach teaches both deactivating (for energy conservation) and activating

(for context awareness) the accelerometers. *Id.* at 47 (citing Ex. 1003 ¶ 171).

Petitioner contends that Kulach and Sakamoto are analogous art to the '256 patent. Pet. 11–12, 47. Petitioner asserts that it would have been obvious to one of ordinary skill “to power off or deactivate a sensor, such as an accelerometer, when not in use, in light of *Kulach*’s teachings, especially considering both *Sakamoto* and *Gotoh* teach mobile devices having limited battery capacity.” *Id.* at 47–48 (citing Ex. 1003 ¶ 172).

We have reviewed the evidence and arguments and determine that Petitioner has presented persuasive evidence that the combination of Sakamoto, Gotoh, and Kulach teaches the limitations of claim 10 as well as a persuasive rationale to combine the references.

Patent Owner argues that “Mr. Andrews makes no attempt to explain how or why the accelerometer of Kulach in a proposed combination of Sakamoto with Gotoh and Kulach would stop being used in response to a signal level.” PO Resp. 19. We do not agree with this argument. As discussed above, Petitioner relies on Sakamoto for monitoring signal levels, comparing to thresholds, and then setting position modes, with Kulach’s functionality used in combination. Pet. 34–36, 45–47. More specifically, Petitioner relies on Kulach in the combination for its teaching of “power[ing] off or deactivat[ing] a sensor, such as an accelerometer, when not in use.” *Id.* at 47. Mr. Andrews testifies that “[b]ecause Kulach expressly teaches disabling the accelerometer when not in use ‘to conserve energy,’” a person of ordinary skill in the art “would have understood that conservation of energy is achieved by ‘deactivating’ the accelerometer.” Ex. 1003 ¶ 171 (citing Ex. 1007 ¶ 90). Mr. Andrews additionally testifies

that because Sakamoto teaches methods of power control to reduce power consumption, one of ordinary skill would have been motivated to use Kulach's technique of powering off sensors. *Id.* ¶ 173 (citing Ex. 1004 ¶¶ 24, 26). Further, Mr. Andrews testifies that the combination would have had a reasonable expectation of success in view of Sakamoto's recognition of methods of powering components on and off as needed in normal mode. *Id.* (citing Ex. 1004 ¶ 24). Based on this testimony, and the referenced supporting evidence, we determine that Petitioner presents persuasive evidence that Kulach in combination with Sakamoto-Gotoh teaches the claim limitation and provides a persuasive rationale to combine the references.

Accordingly, on the full record, Petitioner has established by a preponderance of the evidence that claim 10 would have been obvious over the combination of Sakamoto, Gotoh, and Kulach.

F. Alleged Obviousness of Claims 8 and 9 Over Sakamoto, Gotoh, and Krasner

Petitioner contends that claim 8 and 9 would have been obvious over Sakamoto, Gotoh, and Krasner. Pet. 48–69. To support its contentions, Petitioner provides explanations as to how Sakamoto, Gotoh, and Krasner teach each claim limitation and why there is a motivation to combine the references. *Id.* Petitioner also relies upon the Andrews Declaration (Ex. 1003) and the Supplemental Andrews Declaration (Ex. 1080) to support its positions. Patent Owner argues that Petitioner has not met its burden to demonstrate that the prior art teaches an accelerometer that is both activated and deactivated in response to a signal strength level. PO Resp. 17–19.

We begin our discussion with a brief summary of Krasner, and then address the evidence and argument presented.

1. Krasner (Ex. 1010)

Krasner teaches a mobile device including a GPS receiver and a communication system, as depicted in Figure 1, reproduced below.

Ex. 1010, 2:29–33.

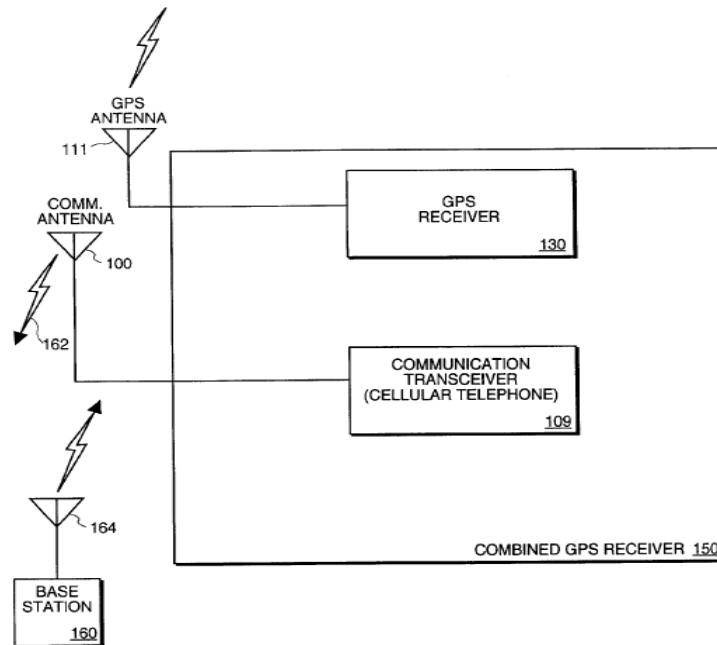


FIG. 1

As shown in Figure 1, above, Krasner's system includes mobile device 150 with GPS receiver 130. Ex. 1010, 3:16–17. Mobile device 150 also includes communication transceiver section 109. *Id.* at 3:31–32.

Communication transceiver 109 transmits navigational data processed by GPS receiver 130 to remote base station 160. *Id.* at 3:33–36. Krasner's system determines position information using GPS. *Id.* at 3:5–16, 6:1–9. Krasner's mobile device reduces cross-interference between the communication transceiver and GPS receiver using signal gating. *Id.* at code (57), 6:37–62, 7:10–39.

2. Analysis

Petitioner relies on similar arguments and evidence for the majority of the limitations of claims 8 and 9 as those presented for claim 10 under the Sakamoto-Gotoh ground. *See* Pet. 48. Claim limitation 8[c] recites that the location monitoring apparatus includes “a power amplifier to amplify a signal level of at least one of the receive communication signal and a transmit communication signal,” and limitation 8[d] includes “battery monitor circuitry to measure available battery power and adjust power usage to the power amplifier.” Ex. 1001, 11:3–7. Claim limitations 9[c] and 9[e] recite a location monitoring apparatus with “power amplifier circuitry” and “battery management circuitry to adjust power level applied to the location tracking circuitry and the power amplifier circuitry responsive to the signal level.” *Id.* at 11:19, 12:2–4.

For the recited “power amplifier” and “power amplifier circuitry,” Petitioner relies on Krasner’s teachings of a combined GPS receiver and communication system where the communication transceiver section of the mobile device includes a power amplifier. *Id.* at 49 (citing Ex. 1010, 3:5–16, 3:31–41, 5:20–25, 5:64–67, Fig. 2). Petitioner asserts that power amplifiers used with transceivers were well-known in the art. *Id.* (citing Ex. 1003 ¶ 175).

More specifically, Petitioner relies on Krasner’s disclosure that “power amplifier 108 boosts the signal level of the communication signal, and this boosted signal is then transmitted to the communication antenna 100 through switch 101.” Pet. 57 (citing Ex. 1010, 5:64–67). In view of this disclosure, Petitioner argues that a person of ordinary skill in the art would have understood that Krasner teaches a power amplifier as recited in claim 8.

Id. at 58 (citing Ex. 1003 ¶¶ 197–198). Petitioner further asserts that Sakamoto, as modified to perform the signal gating method of Krasner, adjusts power usage to the power amplifier in response to the battery level and the detected satellite signal level. *Id.* at 61. Petitioner relies on Krasner’s disclosure of the “gating signal synchroniz[ing] the power control and GPS receiver operation.” *Id.* at 62 (citing Ex. 1010, 6:58–59). Petitioner additionally refers to Krasner’s disclosure of power reduction of the transmitter “for a period of time during which satellite positioning system signals may be processed, after which the transmitter is again powered up.” *Id.* at 62 (citing Ex. 1010, 6:55–58). Petitioner also relies on Sakamoto’s disclosures of battery monitoring circuitry and setting different modes to reduce power consumption. *Id.* at 59–60. Petitioner asserts that Sakamoto’s operation, modified with Krasner’s activation and deactivation of the power amplifier, teaches limitation 8[d]. *Id.* at 61–64. Petitioner relies on similar evidence and arguments for the teaching of the limitations of claim 9. *Id.* at 65–69.

Petitioner asserts that because Krasner, like the ’256 patent, discloses a portable electronic tracking device including a GPS receiver, Krasner is in the same field of endeavor and is pertinent to a problem to be solved by the claimed invention in the ’256 patent. Pet. 11. Petitioner argues that a person of ordinary skill in the art would be motivated to include Krasner’s gating function to improve Sakamoto’s system in order to “reduce cross-interference between the GPS receiver and transceiver signals while preventing increased power consumption.” *Id.* at 52 (citing Ex. 1003 ¶ 182).

We have reviewed the evidence and arguments and determine that Petitioner has presented persuasive evidence that the combination of

Sakamoto, Gotoh, and Krasner teaches the limitations of claims 8 and 9 and provides a persuasive rationale to combine the references.

Patent Owner presents the same arguments for claims 8 and 9 as it presents for claim 10, that is, Patent Owner alleges that Petitioner has not met its burden to demonstrate that the prior art teaches an accelerometer that is both activated and deactivated in response to a signal strength level. PO Resp. 17–19. We do not agree with these arguments for the reasons discussed for claim 10 in Section II.D.3 *supra*.

Accordingly, on the full record, Petitioner has established by a preponderance of the evidence that claims 8 and 9 would have been obvious over the combination of Sakamoto, Gotoh, and Krasner.

G. Alleged Obviousness of Claims 8 and 9 Over Sakamoto, Gotoh, Krasner, and Kulach

Similar to the Sakamoto-Gotoh-Kulach ground presented for claim 10, Petitioner relies on Kulach under this ground for teaching “the accelerometer activates or deactivates” limitations of claims 8 and 9, to the extent Gotoh does not teach these limitations. Pet. 69. Petitioner relies on similar evidence and argument to that presented for claim 10 in its assertions for claims 8 and 9. *Id.* at 69–70.

Patent Owner presents no arguments specifically related to this ground and relies on its arguments presented for claim 10. *See* PO Resp. 19. We do not agree with these arguments for the reasons discussed in Section II.E.2 *supra*.

We have reviewed the evidence and arguments and determine that Petitioner has presented persuasive evidence that the combination of

Sakamoto, Gotoh, Krasner, and Kulach teaches the limitations of claims 8 and 9 and provides a persuasive rationale to combine the references.

Accordingly, on the full record, Petitioner has established by a preponderance of the evidence that claims 8 and 9 would have been obvious over the combination of Sakamoto, Gotoh, Krasner, and Kulach.

III. CONTINGENT MOTION TO AMEND

On a contingent basis, Patent Owner filed a Motion to Amend to replace original claims 8–10 with proposed substitute claims 11–13. Mot. 1–2. We have determined that original claims 8–10 of the ’256 patent have been shown to be unpatentable by a preponderance of the evidence. Accordingly, we proceed to address Patent Owner’s Motion to Amend.

Although the proposed substitute claims must meet the requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121, Petitioner “bears the burden of persuasion to show, by a preponderance of the evidence, that any proposed substitute claims are unpatentable.” 35 U.S.C. § 316(d); 37 C.F.R. § 42.121(d)(2); *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4 (PTAB Feb. 25, 2019) (precedential) (citing *Aqua Prods. Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017); *Bosch Auto. Serv. Sols. LLC v. Iancu*, 878 F.3d 1027 (Fed. Cir. 2017)).

Before considering the patentability of any substitute claims, we 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. Patent Owner is required to show that: (1) the amendment responds to a ground of unpatentability involved in the trial; (2) the amendment does not seek to enlarge the scope of the claims of the patent or

introduce new subject matter; (3) the amendment proposes a reasonable number of substitute claims; and (4) the proposed claims are supported in the original disclosure. 37 C.F.R. § 42.121; *Lectrosonics*, Paper 15.

Patent Owner proposes amendments to claims 8–10 by substitute claims 11–13, respectively, that recite as follows, with underlining designating added text and double brackets designating deleted text, and with letters in single brackets added to the limitations of proposed substitute claim 11 for reference purposes:

11. [a] A location monitoring apparatus for an electronic tracking device to track by a monitoring station comprising:

[b] an accelerometer to generate displacement vectors associated with the electronic tracking device;

[c] a signal processor to measure a signal level of a receive communication signal comprising location coordinates information, wherein the accelerometer activates or deactivates based in part of a value of the signal level of the receive communication signal;

[d] a power amplifier to amplify a signal level of at least one of the receive communication signal and a transmit communication signal; and

[e] battery monitor circuitry to measure available battery power and adjust power usage to the power amplifier responsive to available battery power and to a signal level of the receive communication signal, [f] wherein the power amplifier consumes at least reduced power while the accelerometer is active.

12. A location monitoring apparatus for an electronic tracking device to track by a monitoring station comprising:

an accelerometer to generate displacement vectors associated with the electronic tracking device;

a signal processor to measure a signal level of a receive communication signal comprising location coordinates information, wherein the accelerometer activates or deactivates based in part of a value of the signal level of the receive communication signal;

power amplifier circuitry;

location tracking circuitry; and

battery management circuitry to adjust power level applied to the location tracking circuitry and the power amplifier circuitry responsive to the signal level, wherein at least one of the power amplifier circuitry and the location tracking circuitry consumes at least reduced power while the accelerometer is active.

13. A location monitoring apparatus for an electronic tracking device powered by a battery to track by a monitoring station comprising:

an accelerometer to generate displacement vectors associated with the electronic tracking device; [[and]]

a signal processor to measure a signal level of a receive communication signal comprising location coordinates information; and

a battery power monitor configured to activate and deactivate at least one portion of the electronic tracking device to conserve battery power in response to a signal level of the receive communication signal, wherein the accelerometer activates or deactivates based in part on the signal level of the receive communication signal and the at least one portion of the electronic tracking device is deactivated by placing the at least one portion in a low power mode in which the at least one portion consumes at least reduced power.

Mot. 25–27 (Claims Appendix).

A. Requirements Under 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121

Patent Owner asserts that its motion to amend proposes a reasonable number of substitute claims, is not broadening, and is responsive to the grounds of unpatentability involved in the proceeding. Mot. 2–3. Patent Owner proposes a single substitute claim for each challenged claim (i.e., one-for-one), and, therefore, meets the requirement for a reasonable number of proposed substitute claims. *See* 37 C.F.R. § 42.121(a)(3); *see also Lectrosonics*, Paper 15 at 4 (“There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim.”). Patent Owner also proposes narrowing limitations in direct response to the grounds of unpatentability involved in this proceeding. *See* Mot. 2–3. Petitioner does not dispute Patent Owner’s contentions as to these statutory and regulatory requirements. *See generally* Pet. Mot. Opp. We determine that Patent Owner has met these statutory and regulatory requirements for a motion to amend.

As to whether the proposed substitute claims are supported in the original disclosure, Patent Owner asserts that several portions of Application Ser. No. 11/969,905 (“the ’905 application”)¹² disclose the limitations

¹² The ’256 patent issued from the ’905 application. Ex. 1001, code (21). In its Motion to Amend, Patent Owner cites the published version of the ’905 application—U.S. Pub. No. 2009/0174603 A1 (“the ’603 publication”)—rather than the ’905 application, to show support for the substitute claims. *See* Mot. 4 (citing Ex. 2004). Petitioner’s Opposition similarly cites to the ’603 publication. *See* Pet. Mot. Opp. 1–2. In our Preliminary Guidance on the Motion to Amend, we noted that Patent Owner was required to cite the ’905 application. Paper 28, 4 (citing *Lectrosonics* for the requirement that a motion to amend must set forth written description support in the originally filed disclosure of the subject patent). In its Reply, Patent Owner correctly

“battery monitor circuitry,” as recited in substitute claim 11, “battery management circuitry,” as recited in substitute claim 12, and “battery power monitor,” as recited in substitute claim 13 (collectively referred to by Petitioner as “battery monitor”). Mot. 5–6, 8–11. Petitioner contends Patent Owner has not shown that the ’905 application adequately supports the battery monitor limitations, which are limitations recited in original claims 8–10, respectively. Pet. Mot. Opp. 1. More specifically, Petitioner contends that paragraph 29 of the ’905 application states that battery level monitor 116 merely detects a battery level, but it does not disclose battery level monitor 116 as performing any of the claimed functions (i.e., adjusting a power level or power usage or activating/deactivating circuitry). *Id.* (citing Ex. 2004 ¶ 29). Petitioner further contends that paragraphs 31, 32, and 36 the ’905 application merely describe certain elements being placed in “a sleep or standby mode or low power mode,” but they do not disclose that it is the battery monitor that places the components in any of the modes. *Id.*

Patent Owner asserts that paragraph 36 of the ’905 application discloses “power amplifier consumes at least reduced power,” as recited in proposed substitute claim 11, and similarly recited in proposed substitute claim 12. Mot. 6–7, 9. Petitioner contends that Patent Owner has not shown that the ’905 application adequately supports this limitation. Pet. Mot. Opp.

refers to the ’905 application. *See* PO Mot. Reply 1–4 (citing Ex. 2015). Herein, we refer to the disclosures of the ’905 application, except when we refer to the cites from the Motion to Amend and Petitioner’s Opposition, which reference the ’603 publication. We note that the content of the ’603 publication is substantially similar to the ’905 application and Petitioner does not assert that there are any differences between the publication and the original application that affect consideration of the merits. As such, we determine the earlier citations to the ’603 publication are harmless error.

2. More specifically, Petitioner contends that paragraph 36 of the '905 application describes the transceiver circuitry, not the power amplifier, as consuming the reduced battery power. *Id.* (citing Ex. 2004 ¶ 36). Petitioner argues that the amplifier as disclosed in paragraph 31 is a different component than location tracking circuitry 114. *Id.*

Patent Owner has shown that its proposed substitute claims do not introduce new matter. Turning first to the battery limitations, the '905 application states that “[b]attery level detection circuitry (e.g., battery level monitor 116) detects a battery level of battery 118.” Ex. 2015, 9:9–10; *accord* Ex. 2004 ¶ 29. In addition, it states that, “[i]n response to measured signal strength level, a power management circuitry (e.g., battery monitor) controls power levels associated with [a] tracking device to reduce or increase power consumption of a transceiver and its associated circuitry.” Ex. 2015, 4:30–5:2; *accord* Ex. 2004 ¶ 14. This disclosure provides support that a battery monitor controls power levels associated with a tracking device to reduce or increase power consumption of a transceiver and its associated circuitry, which is sufficient disclosure for proposed substitute claim 13’s limitation which recites “a battery power monitor configured to activate and deactivate at least one portion of the electronic tracking device to conserve battery power.” This disclosure also provides support for the portion of the proposed substitute claim 12 limitation that recites “battery management circuitry to adjust power level applied to the location tracking circuitry . . . wherein . . . the location tracking circuitry consumes at least reduced power.” Below we address issues related to portions of the proposed substitute claims 11 and 12 specific to a power amplifier.

Turning to the issue of whether the '905 application provides sufficient support that the claimed “battery monitor circuitry” adjusts power to the power amplifier, as well as whether the claimed power amplifier consumes at least reduced power, the '905 application states:

in one embodiment, the present invention conserves battery power by placing on standby, low power mode, or disabling entirely GPS signal, acquisition, circuitry and other associated devices, e.g., all or a portion of amplifier block 120 including power amplifiers, LNAs, switches, and the like. Furthermore, during supplemental location coordinates tracking, e.g., electronic device proximity measurements, the transceiver circuitry (e.g., transceiver 102, location tracking circuitry 114, and signal[] processing circuitry 104) consumes reduced battery power for GPS circuitry while the electronic tracking device 100 communicates displacement vectors (e.g., differential location coordinates) to monitoring station 110 (e.g., a mobile phone, a personal digital assistant) through a wireless network 140.

Ex. 2015, 11:24–12:2; *accord* Ex. 2004 ¶ 36 (emphases added). As discussed above, the '905 application further states that “[i]n response to measured signal strength level, a power management circuitry (e.g., battery monitor) controls power levels associated with [a] tracking device to reduce or increase power consumption of transceiver and its associated circuitry.”

Ex. 2015, 4:30–5:2; *accord* Ex. 2004 ¶ 14.

We do not discern that the use of “e.g.,” that is, “for example” in listing examples of “transceiver circuitry,” precludes a power amplifier from being included in the category of transceiver circuitry that has its power level controlled by the battery monitor in response to a signal level and

consumes reduced battery. Ex. 2015, 4:30–5:2, 11:27–12:2. Further, the ’905 application explicitly states that battery power is conserved by “placing on standby, low power mode, or disabling entirely . . . e.g., all or a portion of amplifier block 120 *including power amplifiers.*” *Id.* at 11:24–27 (emphasis added). Based on the disclosures of the ’905 application, we find that there is sufficient written description support for the proposed substitute claims 11 and 12.

Accordingly, we determine that Patent Owner has shown that the ’905 application sets forth sufficient written description support for the new limitations in proposed substitute claims 11–13. We also determine that the original disclosure of the ’905 application supports the limitations recited in original claims 8–10 that have been carried over to proposed substitute claims 11–13.

We next analyze whether Petitioner shows that proposed substitute claims 11–13 are unpatentable by a preponderance of the evidence based on the entirety of the record.

B. Challenge to Proposed Substitute Claims Under § 35 U.S.C. § 112, First Paragraph

As described in Section III.A *supra*, Petitioner contends proposed substitute claims 11–13 fail to comply with the written description requirement. Pet. Mot. Opp. 1–3. For the reasons previously discussed, we determine that the ’905 application sets forth sufficient written description support for the proposed substitute claims under § 35 U.S.C. § 112, first paragraph.

C. Challenges to the Proposed Substitute Claims under § 103

Patent Owner and Petitioner address the patentability of proposed substitute claims 11–13 on the following grounds:

Claim(s)	35 U.S.C. §	References/Basis
13	103(a)	Sakamoto, Gotoh, Alberth ¹³
13	103(a)	Sakamoto, Gotoh, Gronemeyer ¹⁴
13	103(a)	Sakamoto, Gotoh, Kulach, Alberth
13	103(a)	Sakamoto, Gotoh, Kulach, Gronemeyer
11, 12	103(a)	Sakamoto, Gotoh, Krasner, Krasner '327 ¹⁵
11, 12	103(a)	Sakamoto, Gotoh, Krasner, Kulach, Krasner '327

Pet. Mot. Opp. 6–25; PO Mot. Reply 4–12.

We address the patentability of the proposed substitute claims below in view of these challenges.

1. Claim Construction

Patent Owner asserts that the added limitation of proposed substitute claim 11, “wherein the power amplifier consumes at least reduced power while the accelerometer is active,” “requires that the power amplifier continues to consume power while the accelerometer is active” and that “although power usage to the power amplifier is adjusted, power usage is not

¹³ U.S. Patent 6,438,381 B1, filed June 8, 2000, issued August 20, 2002. Ex. 1076.

¹⁴ U.S. Patent 6,985,811 B2, filed June 20, 2003, issued January 10, 2006. Ex. 1077.

¹⁵ U.S. Patent 5,825,327, filed October 7, 1996, issued October 20, 1998. Ex. 1081.

eliminated and the power amplifier is not shut off.” Mot. 12. For proposed substitute claim 12, Patent Owner makes similar assertions for the added limitation “wherein . . . the power amplifier circuitry and the location tracking circuitry consumes at least reduced power.” *Id.* at 14. Patent Owner additionally makes a similar assertion for proposed substitute claim 13, that is, “at least one portion of the electronic tracking device continues to consume power while the accelerometer is active.” *Id.* at 15. Patent Owner argues that this claim interpretation is supported by the written description of the ’905 application. PO Mot. Reply 2–4.

Petitioner contends that the plain and ordinary meaning of “consumes at least reduced power” should apply. Pet. Mot. Opp. 3. Petitioner argues that Patent Owner’s proposed construction imports negative limitations, that is, the limitations that the power “is not shut off” or “not eliminated.” *Id.*

As discussed further below, we need not expressly construe the claim terms related to power consumption because the challenged claims are unpatentable over the asserted prior art, even under Patent Owner’s proposed construction. *See Nidec Motor Corp.*, 868 F.3d at 1017; *Vivid Techs.*, 200 F.3d at 803.

2. *Patentability of Proposed Substitute Claim 13 in View of Challenge Based on Sakamoto, Gotoh, and Gronemeyer*

The parties address whether the combined disclosures of Sakamoto, Gotoh, and Gronemeyer render proposed substitute claim 13 obvious. Pet. Mot. Opp. 11–14; PO Mot. Reply 7–9; Pet. Mot. Sur-reply 7–11.

Gronemeyer describes a low power real time clock (RTC) operated continuously in a GPS receiver unit while some receiver components are powered down. Ex. 1077, code (57). More specifically, power is conserved

in the GPS receiver unit by shutting down selected components, including a GPS oscillator, during periods when the GPS receiver unit is not actively acquiring satellite information used to calculate its location. *Id.* at 6:41–45.

As explained above, Petitioner has shown by a preponderance of the evidence that the combination Sakamoto and Gotoh teaches each limitation of claim 10. *See supra* Section II.D.3. For the same reasons provided there, we find the combination of Sakamoto and Gotoh teaches the limitations of proposed substitute claim 13 that are identical to those of claim 10. We focus on the amendments in proposed substitute claim 13. In particular, proposed substitute claim 13 recites that “at least one portion of the electronic tracking device is deactivated by placing the at least one portion in a low power mode in which the at least one portion consumes at least reduced power.” *See* Mot. 26–27 (Claims Appendix).

Petitioner argues that the combination of Sakamoto, Gotoh, and Gronemeyer teaches all elements of the proposed substitute claim 13. Pet. Mot. Opp. 11–14. More specifically, Petitioner asserts that Gronemeyer discloses conserving power in a GPS receiver unit by shutting down select components “during periods when the GPS receiver unit is not actively acquiring satellite information used to calculate the location of the GPS receiver unit.” *Id.* at 11 (citing Ex. 1077, 6:41–45, 5:11–14, 14:13–23). Petitioner refers to Gronemeyer’s disclosure that “powering down these components is very desirable in a portable GPS receiver unit to conserve power resources.” *Id.* (citing Ex. 1077, 4:1–5, 4:66–5:3, 14:16–21).

Petitioner contends that Gronemeyer discloses that the GPS receiver unit consumes at least reduced power in the low power mode because the low power time keeping (“LPTK”) circuit 200 “remains on” and consumes

power, even when “[s]elected components residing on the GPS receiver unit” are “shut down (deactivated) to conserve power” during Gronemeyer’s sleep mode. Pet. Mot. Opp. 12 (citing Ex. 1077, 7:8–11, 14:13–2, Figs. 3, 4). Petitioner contends that the LPTK circuit in Gronemeyer includes K32 oscillator 302 that “resid[es] in a low power time keeping circuit [and] accurately preserves GPS time when the selected components are shut off.” *Id.* (citing Ex. 1077, 5:14–17, 6:45–48, 12:9–13). Mr. Andrews provides supporting testimony that, even during Gronemeyer’s sleep mode, “the low power components of low power time keeping circuit 200 remain on” and “‘low power’ components that operate continuously consume at least some power continuously.” Ex. 1080 ¶¶ 39–40.

Petitioner additionally contends a person of ordinary skill in the art would have been motivated to modify the Sakamoto-Gotoh combination to include a portion of Gronemeyer’s components, that is, low power clock 306 and oscillator 302, that would remain powered in a low power mode. Pet. Mot. Opp. 13. Specifically, Petitioner contends that a person of ordinary skill in the art would have been motivated to make such a modification to achieve the advantages expressly taught by Gronemeyer, including saving power and more quickly reacquiring GPS satellite signals. *Id.* at 13–14 (citing Ex. 1077, 3:25–28, 14:3–12, 14:45–48). Mr. Andrews testifies that a person of ordinary skill in the art “would have recognized that Gronemeyer teaches advantages over conventional systems that do not maintain the accuracy of various clocking signals because said conventional systems power down components that consume significant power, including a GPS oscillator and associated timing system.” Ex. 1080 ¶ 41. Mr. Andrews testifies that a person of ordinary skill “would have been motivated to

include Gronemeyer's low power time keeping circuit (including low power clock 306 and K32 oscillator 302) in the modified Sakamoto system" in order to save battery power and for faster signal acquisition by avoiding cold starts. *Id.* ¶ 42. Mr. Andrews further testifies that a person of ordinary skill in the art "would have understood that a combination with Gronemeyer would have advantageously allowed Sakamoto's at least one portion of the electronic tracking device, including GPS receiver 10, to consume reduced power in a low power mode, such as the stop-position search mode, thus saving battery resources in a mobile device with a limited power supply as taught by Gronemeyer." *Id.* Mr. Andrews additionally testifies that a person of ordinary skill in the art would have understood that there would have been a reasonable expectation of success in the combination because Sakamoto and Gronemeyer teach similar portable devices with a GPS receiver and combining components would have been within the skillset of a person of ordinary skill for implementation. *Id.* ¶ 43.

We agree with Petitioner that the combination of Sakamoto, Gotoh, and Gronemeyer discloses deactivating a portion of the electronic tracking device to place it in a low power mode with at least one portion of it, i.e., the low power clock and K32 oscillator in the LPTK circuit, continuing to consume power. Further, Petitioner provides persuasive evidence that one of ordinary skill in the art would have been motivated to modify the Sakamoto–Gotoh combination to include Gronemeyer's low power operation.

Patent Owner asserts that "Petitioner does not, and cannot, assert that Gronemeyer's oscillator 302 and low power clock 306 are the at least one portion of GPS receiver 100 that is 'deactivated by placing the at least one

portion in a low power mode in which the at least one portion consumes at least reduced power’ as recited.” PO Mot. Reply 7. Patent Owner argues that, although Gronemeyer discloses that GPS circuitry, that is, its GPS receiver, is powered off, a distinct time circuit, which is a separate portion of the GPS receiver, is utilized to maintain GPS time. *Id.* (citing Ex. 1077, 6:36–48, Figs. 3, 4). More specifically, Patent Owner asserts that “[a]lthough the GPS oscillator and K32 oscillator are both located in a GPS receiving unit, the K32 oscillator is not part of the GPS circuitry.” *Id.* at 8. Patent Owner contends that because Gronemeyer discloses that “[a] K32 . . . oscillator residing in a low power time keeping circuit accurately preserves GPS time when the selected components are shut off,” “Gronemeyer clearly discloses that the deactivated portion (i.e., GPS circuitry) is ‘shut off.’” *Id.* (citing Ex. 1077, 5:13–16, 6:45–48). Patent Owner argues that “Gronemeyer cannot disclose that such deactivated portion ‘consumes at least reduced power’ as recited . . . , when ‘shut off’ means that such deactivated portion consumes *no* power.” *Id.* Patent Owner further asserts that Petitioner relies solely on Gronemeyer for disclosing the claim limitation. *Id.* at 8–9.

We do not agree with Patent Owner’s arguments. As an initial matter, although Patent Owner argues that the K32 oscillator is not part of the GPS circuitry, Patent Owner does not explain why that is so. As shown in Petitioner’s annotated Figures 3 and 4, reproduced below, LPTK circuit 200 includes K32 oscillator 302 and is depicted to be part of GPS receiver unit 100.

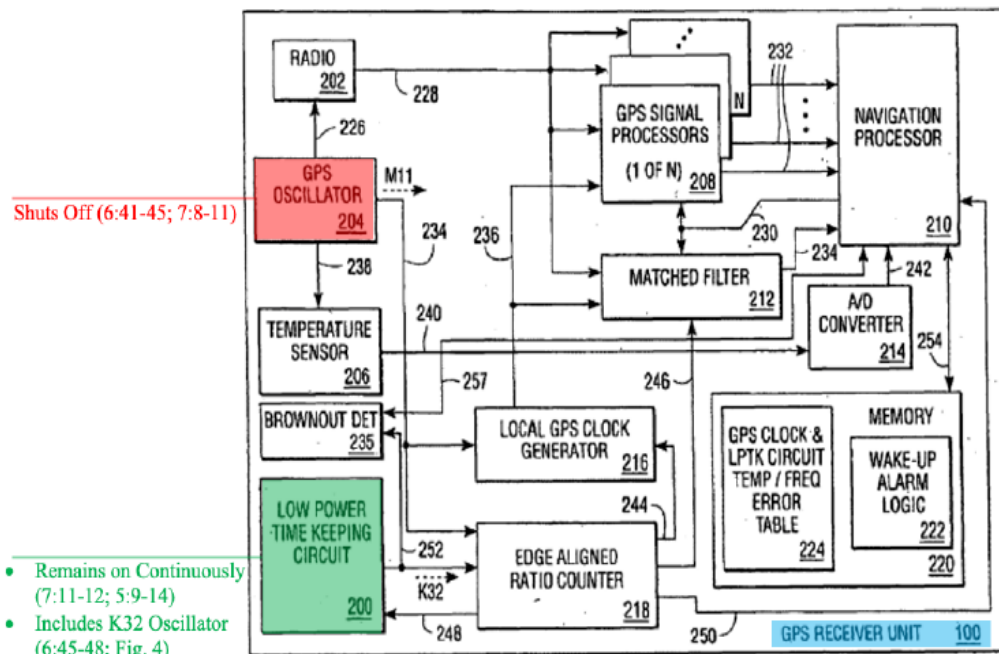


FIG. 3

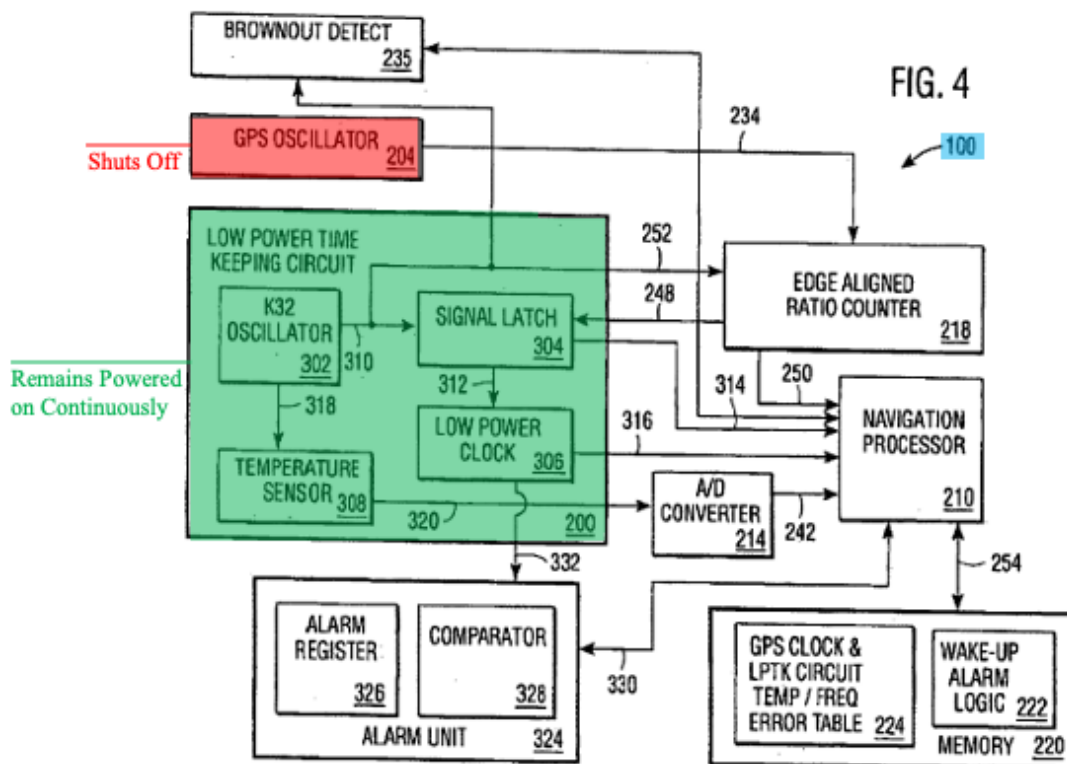


FIG. 4

Referring to Petitioner's annotated Figures 3 and 4 of Gronemeyer, above, Petitioner contends, and we agree, that GPS receiver unit 100 includes

LPTK circuit 200, which includes K32 oscillator 302. Pet. Mot. Sur-reply 7–8. Further, Gronemeyer explicitly discloses that “selected components of the GPS receiver unit 100, includ[e] a low power time keeping circuit 200.” Ex. 1077, 8:3–5.

We also do not agree with Patent Owner’s argument that Petitioner relies solely on Gronemeyer for disclosing the claim limitation “at least one portion of the electronic tracking device is deactivated by placing the at least one portion in a low power mode in which the at least one portion consumes at least reduced power.” Instead, Petitioner contends, and Mr. Andrews testifies, that a person of ordinary skill in the art would have been motivated to modify Sakamoto’s GPS receiver to include Gronemeyer’s LPTK circuit (including low power clock 306 and K32 oscillator 302). Pet. Mot. Opp. 13–14; Ex. 1080 ¶¶ 41–42. Mr. Andrews additionally testifies that Gronemeyer’s LPTK circuit advantageously would have been included to save battery power and to allow for faster signal reacquisition in a low power mode, such as the stop-position search mode. Ex. 1080 ¶ 42. Accordingly, we agree that the combination of Sakamoto, Gotoh, and Gronemeyer teaches that when the GPS receiver is placed in the stop-position mode with position searching stopped (deactivated), a portion of the GPS receiver would be in a low power mode, with the LPTK circuit continuing to consume reduced power. Thus, we determine that Petitioner’s proposed combination of Sakamoto, Gotoh, and Gronemeyer teaches the amended limitation in proposed substitute claim 13, even under Patent Owner’s proposed construction, that is, “at least one portion of the electronic tracking device continues to consume power while the accelerometer is active.” Mot. 15.

Also, we note that Patent Owner's arguments appear to try to draw a distinction between the components of GPS receiver unit 100 and "GPS circuitry." *See* PO Mot. Reply 7. Patent Owner does not provide a basis for any alleged distinction. Further, we agree with Petitioner that the only reference to "GPS circuitry" in Gronemeyer indicates that that GPS units continuously power on some components (e.g., a clock), while others are powered down. Pet. Mot. Sur-reply 9–10 (citing Ex. 1077, 3:54–56 ("Typically, a conventional real time clock (RTC) circuit may be used to maintain rough GPS time while the rest of the GPS circuitry is off.")). Additionally, Patent Owner only presents attorney argument in support of its interpretation of Gronemeyer's disclosures, and this argument does not undermine Petitioner's persuasive showing, which is based on evidence of record.

In view of the foregoing, we conclude, that Petitioner has established by a preponderance of the evidence that proposed substitute claim 13 would have been unpatentable in view of Sakamoto, Gotoh, and Gronemeyer.

3. *Patentability of Proposed Substitute Claim 13 in View of Challenge Based on Sakamoto, Gotoh, Kulach, and Gronemeyer*

Petitioner contends that the subject matter of proposed substitute claim 13 would have been obvious over the combination of Sakamoto, Gotoh, Kulach, and Gronemeyer based on (1) Petitioner's analysis of original claim 10 in the Sakamoto-Gotoh-Kulach ground and (2) Petitioner's analysis of proposed substitute claim 13 in the Sakamoto-Gotoh-Gronemeyer ground. Pet. Mot. Opp. 15; *see supra* Section II.E. We have reviewed the evidence and determine that Petitioner has presented persuasive evidence of obviousness. Patent Owner presents no arguments

specific to this ground besides those already addressed, and we do not agree with Patent Owner's arguments for the reasons discussed above. *See generally* PO Mot. Reply.

In view of the foregoing, we conclude that Petitioner has established by a preponderance of the evidence that proposed substitute claim 13 would have been unpatentable in view of Sakamoto, Gotoh, Kulach, and Gronemeyer.

4. Patentability of Proposed Substitute Claim 13 in View of Challenges Based on Sakamoto, Gotoh, and Alberth, with or without Kulach

Because we have determined that proposed substitute claim 13 would have been unpatentable in view of Sakamoto, Gotoh, and Gronemeyer, with or without Kulach, we need not reach Petitioner's other grounds for unpatentability of this claim. *Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020) (nonprecedential) (stating that the "Board need not address issues that are not necessary to the resolution of the proceeding," such as "alternative arguments with respect to claims [the Board] found unpatentable on other grounds").

5. Patentability of Proposed Substitute Claims 11 and 12 in View of Challenges Based on Sakamoto, Gotoh, Krasner, and, Krasner '327, with or without Kulach

The parties address whether the combined disclosures of Sakamoto, Gotoh, Krasner, and Krasner '327, with or without Kulach, render proposed substitute claims 11 and 12 obvious. Pet. Mot. Opp. 15–25; PO Mot. Reply 9–12.

As explained above, Petitioner has shown by a preponderance of the evidence that the combination Sakamoto, Gotoh, and Krasner, with or without Kulach, teaches each limitation of claims 8 and 9. *See supra* Sections II.F and II.G. For the same reasons provided there, we find the combination of Sakamoto, Gotoh, and Krasner, with or without Kulach, teaches the limitations of proposed substitute claims 11 and 12 that are identical to those of claims 8 and 9, respectively. We focus on the amendments in proposed substitute claims 11 and 12. In particular, proposed substitute claim 11 recites that the battery monitor circuitry adjusts power usage to the power amplifier, “wherein the power amplifier consumes at least reduced power while the accelerometer is active.” *See* Mot. 25 (Claims Appendix). Proposed substitute claim 12 recites that the battery management circuitry adjusts the power level to the location tracking circuitry and the power amplifier circuitry, “wherein at least one of the power amplifier circuitry and the location tracking circuitry consumes at least reduced power while the accelerometer is active.” *See id.* at 26.

Similar to the assertions made for claim 8, Petitioner relies on Sakamoto, Gotoh, and Krasner for the teaching of the unmodified limitations. *See* Pet. Mot. Opp. 15–17. Petitioner notes that in the original mapping for claim 8, with the combination of Sakamoto and Krasner used for teaching limitation 8[d], “the Sakamoto system adjusts the power usage to the power amplifier by reducing or cutting off power to the power amplifier when the GPS receiver is position searching.” Pet. Mot. Opp. 15 (citing Pet. 50). Petitioner also refers to the Petition’s mapping of Krasner’s gating method when Sakamoto’s system is operating in the normal positioning mode, with the GPS receiver powered on/off cyclically to

conserve battery power for the teaching of limitation 8[d]. *Id.* at 15–16 (citing Pet. 49, 63–64).

Petitioner relies on Krasner '327 in combination with Sakamoto, Gotoh, and Krasner for the teaching of new limitation 11[f], “wherein the power amplifier consumes at least reduced power while the accelerometer is active.” Pet. Mot. Opp. 17–18. Petitioner asserts that when Sakamoto, as modified by Gotoh, is in the stop-position searching mode, its GPS receiver is not active but the accelerometer is active, as recited in the claim limitation. *Id.* at 21–22.

Petitioner contends that Sakamoto, as modified by Gotoh, discloses transmitting a position determined by the accelerometer to a remote server over a mobile communication line. Pet. Mot. Opp. 22. Petitioner asserts that Sakamoto teaches that the mobile communication line may be disconnected after the terminal transmits a response on terminal position to the remote server. *Id.* at 19–20 (citing Ex. 1004 ¶ 40; Ex. 1080 ¶ 46).

Petitioner relies upon Sakamoto, as modified by Krasner '327, for the teaching of the operation of a power amplifier, that is, the operation of the power amplifier in a reduced power mode when transmission via a communication line is not occurring. Pet. Mot. Opp. 16, 18–21, 23–25. More specifically, Petitioner contends that Krasner '327 teaches setting a power amplifier to a reduced state when no transmissions are sent. *Id.* at 15–16, 18–21, 23, 25 (citing Ex. 1081, 6:65–7:5, 7:9–11). Mr. Andrews testifies that one of ordinary skill in the art would have disconnected the communication line in Sakamoto after transmissions of terminal position to save battery power. Ex. 1080 ¶ 46. Mr. Andrews also testifies that “*Krasner* '327 teaches placing the power amplifier 13 in a reduced power

state until the next transmission is required,” so a person of ordinary skill in the art “would have understood that Sakamoto as modified by Krasner ’327 would likewise have placed the power amplifier in a reduced power state until the next transmission is required.” *Id.* Mr. Andrews testifies that Krasner ’327 discloses “that power to the power amplifier is not cut off or eliminated in at least some cases” (*Id.* ¶ 48), and refers Krasner ’327 as follows:

The transmit power control 18 provides a controlled power signal for the power amplifier 13, the converter 12, and the modulator 11 such that after transmission of a communication signal, the transmit power control unit 18 may cause modulator 11, converter 12 and amplifier 13 to enter a reduced power state. These components typically remain in this reduced power state until a further transmission through the communication link 14A is required. A typical example of this embodiment is a two-way pager system where the mobile unit 100 performs the functions of a two-way receiver and transmitter (in a two way pager system), and the transmitter is turned off (or otherwise consumes reduced power) when the transmitter is not transmitting.

Ex. 1080 ¶ 48 (quoting Ex. 1081, 6:65–7:11).

Petitioner further contends that a person of ordinary skill in the art would have been motivated to place the power amplifier in the modified Sakamoto system in a reduced power state when transmissions are not being performed for power savings, as expressly indicated by Krasner ’327. Pet. Mot. Opp. 24. Mr. Andrews testifies that a person of ordinary skill in the art “would have been motivated to achieve power savings by placing components not being utilized, such as a power amplifier, in a reduced

power state to save additional battery power, as taught by Krasner '327. Ex. 1080 ¶ 50.

We have reviewed the evidence and arguments and determine that Petitioner has presented persuasive evidence that the combination of Sakamoto, Gotoh, Krasner, and Krasner '327, with or without Kulach, teaches the limitations of proposed substitute claim 11. Petitioner also has provided a persuasive rationale to combine the references. More specifically, Krasner '327 teaches a reduced power state for a power amplifier when transmissions are not being sent, which offers the advantage of power savings when it is applied in Sakamoto. *See* Ex. 1080 ¶ 46; Ex. 1081, 6:65–7:11. Accordingly, we determine that Petitioner's proposed combination of Sakamoto, Gotoh, Krasner, and Krasner '327 with or without Kulach, teaches the limitations of proposed substitute claim 11 even under Patent Owner's proposed construction of the "consumes at least reduced power" limitation. *See* Mot. 12 (proposing that "consumes at least reduced power" means that "the power amplifier continues to consume power while the accelerometer is active. That is, although power usage to the power amplifier is adjusted, power usage is not eliminated and the power amplifier is not shut off.")).

Patent Owner argues that Petitioner's mapping of proposed substitute claim 11 "is, at best, convoluted, and, at worst, contradictory." PO Mot. Reply 9. Patent Owner asserts that Petitioner relies on a proposed combination of Sakamoto and Gotoh in which Sakamoto's GPS receiver is deactivated in stop-positioning mode, but in the proposed combination of Sakamoto, Krasner, and Krasner '327, Sakamoto performs GPS positioning in response to a position search request message. *Id.* Further, Patent Owner

argues that Petitioner specifically maps that Krasner's gating method is used when the Sakamoto system is operating in the normal positioning mode. *Id.* Patent Owner argues that "Gotoh's accelerometer is only active in Sakamoto's stop positioning mode, but Krasner '327's power amplifier consumes reduced power only in Sakamoto's normal sensitivity or high sensitivity modes." *Id.* at 10.

We do not agree with Patent Owner's arguments on these issues because they are not based on Petitioner's mapping of the claim limitations. As discussed above, Petitioner relies upon Krasner's gating method when the Sakamoto system is in the normal positioning mode for the teaching of limitation 11[e], and relies upon Krasner '327's teaching of reduced power to the power amplifier in Sakamoto system when in the stop-position searching mode with positioning performed using the accelerometer for the teaching of limitation 11[f]. Petitioner's basis for teaching limitation 11[f] is that in Sakamoto's stop-position searching mode, the mobile communication line is connected to periodically transmit the position, with the power amplifier active for cellular transmission. *See* Pet. Mot. Opp. 16–18. The mobile communication line is then disconnected after the position is sent, with the power amplifier set to a reduced power state, as discussed above. *See id.* We discern no inconsistencies with Petitioner's assertions regarding respective limitations 11[e] and 11[f]. We agree with Petitioner that these limitations recite that the power amplifier consumes reduced power when the accelerometer is active (limitation 11[f]), but the claim does not require that the adjustment of the power usage responsive to the signal level must also occur while the accelerometer is active (limitation 11[e]). *See* Pet. Mot. Sur-reply 12. As discussed, Petitioner demonstrates that battery monitor

circuitry measures available battery power and adjusts power usage to the power amplifier in one mode of Sakamoto's operation and demonstrates that the power amplifier consumes at least reduced power while the accelerometer is active in another mode of operation.

Patent Owner also argues that even if the power amplifier consuming reduced power of Krasner '372 were properly applied to Sakamoto's stop-positioning mode, this would be in response to "Sakamoto's 'line control signal' or 'line mode information' and not 'responsive to a signal level'" as per the claim. PO Mot. Reply 11. On this issue we agree with Petitioner that Patent Owner conflates limitations 11[e] and 11[f], as discussed above. Pet. Mot. Sur-reply 12.

Petitioner presents the same arguments and evidence in support of its challenge to proposed substitute claim 12 on the ground of obviousness over Sakamoto, Gotoh, Krasner, and, Krasner '327, with or without Kulach. Pet. Mot. Opp. 15–25. Patent Owner presents the same common arguments for proposed substitute claims 11 and 12. PO Mot. Reply 9–12. We do not find these arguments persuasive for the reasons discussed above.

In view of the foregoing, we conclude that Petitioner has established by a preponderance of the evidence that proposed substitute claims 11 and 12 would have been unpatentable in view of Sakamoto, Gotoh, Krasner, and Krasner '327, with or without Kulach.

IV. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has shown by a preponderance of the evidence that claims 8–10 of the '256 patent are unpatentable. The Motion to Amend is denied as to proposed substitute claims 11–13. In summary:

Claim(s)	35 U.S.C. §	References/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
10	103(a)	Sakamoto, Gotoh	10	
10	103(a)	Sakamoto, Gotoh, Kulach	10	
8, 9	103(a)	Sakamoto, Gotoh, Krasner	8, 9	
8, 9	103(a)	Sakamoto, Gotoh, Krasner, Kulach	8, 9	
Overall Outcome			8–10	

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	11–13
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	11–13
Substitute Claims: Not Reached	

V. ORDER

Accordingly, it is

ORDERED that claims 8–10 of U.S. Patent 8,102,256 B2 have been shown to be unpatentable;

FURTHER ORDERED that Patent Owner’s Motion to Amend is denied as to proposed substitute claims 11–13; and

FURTHER ORDERED that, because this is a Final Written Decision, the parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.¹⁶

¹⁶ 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. 16654 (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).

IPR2020-01191
Patent 8,102,256 B2

FOR PETITIONER:

Jennifer C. Bailey
Adam P. Seitz
ERISE IP, P.A.
Jennifer.bailey@eriseip.com
adam.seitz@eriseip.com

FOR PATENT OWNER:

Shaun D. Gregory
TAFT STETTINIUS & HOLLISTER LLP
sgregory@taftlaw.com