

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC, SAMSUNG ELECTRONICS CO., LTD., AND
SAMSUNG ELECTRONICS AMERICA, INC.,
PETITIONERS,

v.

NARISTE NETWORKS PTY. LTD.,
PATENT OWNER.

CASE IPR2023-01374
PATENT RE48,206

PATENT OWNER'S RESPONSE
37 C.F.R. § 42.120

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CURRENT EXHIBIT LIST¹

No.	Brief Description
1001	U.S. Patent No. RE48,206
1002	Declaration of Scott Andrews
1003	Curriculum Vitae of Scott Andrews
1004	Prosecution History of U.S. Patent No. RE48,206
1005	U.S. Patent No. 5,982,324 to Watters (“Watters”)
1006	U.S. Patent Publication No. 20020151314 to Nohara (“Nohara”)
1007	U.S. Patent No. 6,975,941 to Lau (“Lau”)
1008	INTENTIONALLY LEFT BLANK
1009	INTENTIONALLY LEFT BLANK
1010	INTENTIONALLY LEFT BLANK
1011	INTENTIONALLY LEFT BLANK
1012	INTENTIONALLY LEFT BLANK
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1015	INTENTIONALLY LEFT BLANK
1016	INTENTIONALLY LEFT BLANK
1017	INTENTIONALLY LEFT BLANK
1018	INTENTIONALLY LEFT BLANK
1019	INTENTIONALLY LEFT BLANK
1020	Claim Mapping Table
1021	Nariste Networks Pty. Ltd.’s Sur-Reply in Opposition to Defendants’ Rule 12(b)(6) Motion to Dismiss Under 35 U.S.C. § 251 and the Rule Against Recapture
1022	Yilin Zhao, Vehicle Location and Navigation Systems 43–81 (Illustrated ed. 1997).

¹ Relevant portions of exhibits may be highlighted to help the Panel locate cited sections.

No.	Brief Description
1023	U.S. Patent No. 5,592,173 to Lau et al (“Lau”)
1024	U.S. Patent No. 6,748,224 to Chen et al (“Chen”)
1025	U.S. Patent No. 6,889,053 to Chang et al (“Chang”)
1026	U.S. Patent No. 5,663,734 to Krasner et al (“Krasner”)
1027	U.S. Patent No. 5,594,453 to Rodal et al (“Rodal”)
1028	U.S. Patent No. 7,409,188 to Syrjarinne et al (“Syrjarinne”)
1029	U.S. Patent Publication No. 20050083230 to Harvey et al (“Harvey”)
1030	Xinrong Li, Kaveh Pahlavan, and Jacques Beneat, Performance of TOA estimation Techniques in Indoor Multipath Channels 911–915 (2002).
1031	Flowchart, https://en.wikipedia.org/w/index.php?title=Flowchart&oldid=1169392868 (last visited Aug. 30, 2023).
1032	Central processing unit, https://en.wikipedia.org/w/index.php?title=Central_processing_unit&oldid=1172444772 (last visited Aug. 30, 2023)
1033	Samir S. Soliman and Charles E. Wheatley, Geolocation technologies and applications for third generation wireless 229–251 (2002).
1034	Samir Soliman, Parag Agashe, Ivan Fernandez, Alkinoos Vayanos, Peter Gaal, and Milan Oljaca, gpsOne™: A hybrid position location system 330–335 (2000).
1035	A. M. Turing, On Computable Numbers, With an Application to the Entscheidungsproblem 230–265 (1936).
1036	Defendants’ Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a)
1037	Defendants’ Rule 12(b)(6) Motion to Dismiss Under 35 U.S.C. § 251 and the Rule Against Recapture
1038	Nariste Networks Pty. Ltd.’s Response in Opposition to Defendants’ Rule 12(b)(6) Motion to Dismiss Under 35 U.S.C. § 251 and the Rule Against Recapture

No.	Brief Description
1039	Defendants' Reply in Support of Rule 12(b)(6) Motion to Dismiss Under 35 U.S.C. § 251 and the Rule Against Recapture (Dkt. 23)
1040	Plaintiff's Disclosure of Asserted Claims and Infringement Contentions and Identification of Document Production Accompanying Disclosure
2001	Declaration of Dr. Samuel Pullen
2002	Prosecution History of U.S. Patent No. 8,022,870
2003	Marius Specht, Experimental Studies on the Relationship Between HDOP and Position Error in the GPS System, Metrology and Measurement Systems, Vol. 29 No1, pp. 17-36 (2022)
2004	U.S. Patent No. 6,061,021 to Zibell (Zibell)
2005	U.S. Patent No. 5,894,266 to Wood, Jr. et al ("Wood")
2006	U.S. Patent No. 6,424,843 to Reitmaa et al ("Reitmaa")
2007	P. Misra and P. Enge, Global Positioning System: Signals, Measurement, and Performance, Ganga-Jamuna Press, 2 nd Ed., 2006.
2008	F.J. Bueche and E. Hecht, Schaum's Outline of Theory and Problems of College Physics, McGraw-Hill, 9th Ed., 1997.
2009	E.D. Kaplan and C.J. Hegarty, Eds., GPS: Principles and Applications, Artech House, 2 nd Ed., 2006.
2010	B. Parkinson, J. Spilker, P. Axelrad, P. Enge, Eds., Global Positioning System: Theory and Applications, Volume I, American Institute of Aeronautics and Astronautics (AIAA), 1996.
2011	S. Liao, Why GPS-dependent Apps Deplete Your Smartphone Battery, The Verge (Aug. 17, 2018)
2012	M. Sullivan, <i>A Brief History of GPS</i> , PCWorld (Aug. 9, 2012), available at https://www.pcworld.com/article/461346/a-brief-history-of-gps.html
2013	E. Eason, <i>Smartphone Battery Inadequacy</i> , Stanford University (Dec. 17, 2020), available at http://large.stanford.edu/courses/2010/ph240/eason1/ .

CLAIM LISTING²

	Limitation
37[pre]	A method of acquiring a position on a mobile wireless communication device for a wireless communications network, said mobile wireless communication device possessing wireless communications capability for said wireless communications network and an embedded GPS module for GPS capability, said GPS referring to GPS-based techniques, said method comprising:
37[a]	determining when said embedded GPS module should be powered on, said embedded GPS module then being powered on,
37[b]	said when said embedded GPS module should be powered on being dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS.
38	The method according to claim 37, wherein said powered on comprises said module powering up from a low-power mode such as a TricklePower power-down mode.
39	The method according to claim 37, wherein said determining when said embedded GPS module should be powered on is also dependent on at least one of; a last satellite position; a last position determined by the GPS; and a last time determined by the GPS.
40[pre]	A mobile wireless communication device for a wireless communications network, said mobile wireless communication device possessing wireless communications capability for said wireless communications network and an embedded GPS module for GPS capability, said GPS referring to GPS-based techniques, said mobile wireless communication device comprising:
40[a]	an embedded GPS module providing a GPS capability for said mobile wireless communication device;
40[b]	and means for determining when said embedded GPS module should be powered on, said embedded GPS module then being powered on,

² As the Response presents the claim listing in its body in fragments and grouped by limitation type, rather than in numerical order, all claim limitations are presented here together so the Panel may easily view them in order and in context. Patent Owner uses Petitioner's numbering designation for consistency.

	Limitation
40[c]	said determining when said embedded GPS module should be powered on being dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS.
41	The mobile device according to claim 40, wherein said powered on comprises said module powering up from a low-power mode such as a TricklePower power-down mode.
42	The mobile device according to claim 40, wherein said determining when said embedded GPS module should be powered on is also dependent on at least one of; a last satellite position; a last position determined by the GPS; and a last time determined by the GPS.
43[pre]	A computer program product for a mobile wireless communication device for a wireless communication network, said mobile wireless communication device possessing wireless communications capability for said wireless communications network and an embedded GPS module for GPS capability, said GPS referring to GPS-based techniques, said computer program product embodied on computer readable storage medium, said computer program product for acquiring a GPS position on said mobile wireless communication device, comprising:
43[a]	a first portion designed to interface with the GPS capability of said mobile wireless communication device;
43[b]	and a second portion designed to determine when said embedded GPS module should be powered on, said embedded GPS module then being powered on,
43[c]	said determining when said embedded GPS module should be powered on being dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS.
44	The computer program product according to claim 43, wherein said powered on comprises said module powering up from a low-power mode such as a TricklePower power-down mode.
45	The computer program product according to claim 43, wherein said determining when said embedded GPS module should be powered on is also dependent on at least one of; a last satellite position; a last position determined by the GPS; and a last time determined by the GPS.

I. INTRODUCTION

The Board should find that Google LLC's, Samsung Electronics Co., Ltd.'s, And Samsung Electronics America, Inc.'s ("Petitioners") inter partes review of U.S. Patent No. RE48206 ("’206 Patent" or "Patent-at-Issue") has not shown the claims of the ’206 Patent to be anticipated or obvious by a preponderance of the evidence. At a high level, neither U.S. Patent No. 5,982,324 (Ex-1005, "Watters") nor U.S. Patent Pub. No. 2002/0151314 (Ex-1006, "Nohara"), alone or in combination, teach, disclose, or suggest "determining when said embedded GPS module should be powered on being dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS" as recited by claim elements 37[b], 40[c], and 43[d], limitations found in the challenged independent claims. Because Petitioners only use U.S. Patent No. 6,975,941 (Ex-1007, "Lau") to challenge dependent claims 38, 41, and 44 (Grounds 3 and 5), Lau in combination with Nohara and Watters does not fix this deficiency.

II. OVERVIEW OF THE PATENT-AT-ISSUE

A. Family and Priority

The Patent-at-Issue is a reissue of U.S. Patent No. 8,002,870, which claims priority to Australian Patent Application No. 2004905025, filed September 2, 2004 through PCT Application No. AU2005001315 filed Aug. 31, 2005.

As such, the effective priority date of the Patent-at-Issue is September 2, 2004, and its patentability should be judged under the pre-AIA statutes.

B. Historical Context

The development of Global Positioning System (“GPS”) technology has played a crucial role in revolutionizing the industry of mobile devices, especially smartphones. However, the power-intensive nature of GPS usage, coupled with the continuous activation of the GPS receiver, contributes significantly to increased energy consumption. Ex-2011.

In the early 2000s, the integration of GPS in smartphones marked a milestone in providing users access to location-based services. Ex-2012

Research indicates that smartphone power consumption can double or triple during heavy GPS use compared to voice calls. Ex-2013

Despite technological advancements in various areas, the underlying technology of GPS has seen minimal changes. *Id.* The slow data transmission rate between the GPS chip and satellites, ranging from 12 to 30 seconds for a single transmission, contributes to prolonged GPS receiver activation and subsequent battery drain. *Id.*

Addressing these challenges, the '206 Patent introduces innovative solutions to optimize GPS efficiency. It proposes a dynamic adjustment mechanism for the power-up period (P_u) based on factors such as position accuracy and acquisition

time. Recognizing that traditional approaches, where GPS remains constantly active, significantly contribute to battery drain, the patent advocates for adaptively altering the power-up period based on real-time conditions. This ensures that the GPS remains active only when necessary for accurate positioning.

The '206 Patent's approach of dynamically adjusting the power-up period according to acceptable error bounds on both position accuracy and acquisition time strives to strike a balance between providing precise location information and conserving battery life. This solution directly addresses historical challenges associated with GPS-related battery consumption in smartphones, presenting a more energy-efficient approach to location-based services.

C. Invention as Illustrated through Embodiments

The '206 Patent addresses the challenges of lengthy GPS acquisition times and reducing power consumption in mobile devices equipped with GPS capabilities. Ex1001 1:23-25. Traditional methods of position determination involved either keeping the GPS device on continuously, draining battery resources, or relying on complex and costly network-based solutions which often provide low accuracy solutions relative to the high accuracy solutions afforded by GPS. *Id.* 1:5-19.

The '206 Patent provides methods, apparatuses, and computer program products for energy-efficient GPS acquisition on a mobile device. *Id.* 10:35-41. The '206 Patent discloses methods and systems that dynamically adjust the power-up

phase of the GPS module based on adaptive predictions, optimizing for positioning accuracy and acquisition time. *Id.* 5:59-61. The '206 Patent also discloses the use of assisted-GPS (A-GPS) systems and periodic power-down approaches, introducing a neural network for adaptive predictions. *Id.* 9:23-26.

The embodiments introduce a technology referred to as “Self-Monitored (SM)-GPS,” applicable not only to Emergency-911 (“E-911”) services but also to any mobile GPS device. *Id.* 6:24-33. SM-GPS enables a device to operate in the most energy-efficient way while maintaining the required position accuracy and acquisition times. *Id.*

The '206 Patent also teaches the implementation of software embedded in a mobile device for self-monitoring and adjusting the P_u to maximize battery conservation. *Id.* 6:24-29. This involves predicting values and adjusting P_u based on predefined bounds for position accuracy and acquisition times. *Id.* 5:36-40.

I. Self-Monitored (SM)-GPS Technology for Adaptive Power-Up Phase

The '206 Patent tackles the challenge of determining P_u in GPS-equipped mobile devices while ensuring precision in position fixes and/or adherence to acceptable acquisition times. *Id.* 6:5-10. To address the limitations of a fixed P_u , which may prove inefficient over time, the '206 Patent describes a system that dynamically adjusts P_u . *Id.* 5:62-65. The '206 Patent describes utilizing factors like past satellite positions, GPS position/time, errors, and current power-up time to

determine the optimal P_u . *Id.* 6:56-64.

A. Device and Software Implementation

FIG. 1 depicts a GPS-equipped mobile device 100, illustrating an embodiment where “software is embedded in a mobile device to self-monitor” and “self-adjust” the P_u for optimal battery conservation. *Id.* 6:28-30. This software is designed to self-monitor the power-up phase (P_u) and autonomously adjust P_u ’s value to maximize battery conservation. *Id.* The invention involves determining the error between the predicted position of the mobile device and its actual position. *Id.* 6:34-37. Prediction techniques, based on history of reported positions (N positions), are employed to predict the device’s position “at some time t later (the next power-up phase).” *Id.* 6:37-39. In an embodiment, “an adaptive filter technique based on neural networks is used for the position prediction.” *Id.* 6:41-43. The adaptive learning algorithm adapts to the device’s historical positions and utilizes neural networks to enhance the accuracy of position predictions. *Id.* 6:41-49. After forming the position error, values such as the position, position error, and the P_u value used at the time of the actual position measurement are stored in the mobile device's memory. *Id.* 6:46-49. Additionally, acquisition time (dt_a) may be stored. *Id.* 6:49-50.

FIG. 2 delineates the inputs that may be used to determine the period of the GPS P_u . *Id.* at 6:51-60:

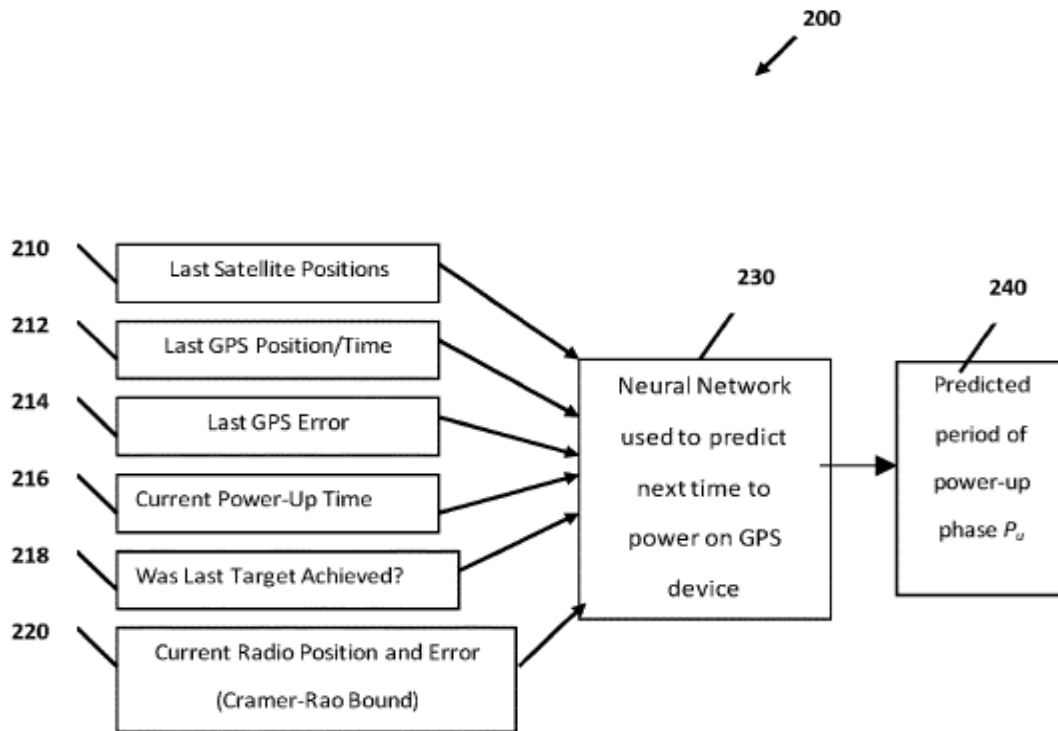


FIG. 2 (Amended)

The inputs (210-220) used to determine P_u include: information about the positions of the last satellites (210); the GPS position and corresponding time from the last instance (212); details about the errors associated with the last GPS reading (214); information about the ongoing power-up time (216); whether the accuracy requirements for the last target were satisfied (218); and information about the current radio positions and associated error (220). *Id.* 6:51-65.

B. Adaptive Adjustment Process

An embodiment of the power-up phase adjustment process is illustrated by FIG. 3. A flowchart (method 300) outlines the steps involved in determining and storing the P_u , acquisition time (dt_a), and prediction error (e_p). *Id.* 6:66-67; 7:1-3.

The process begins at step 310, where “the last N positions reported are used

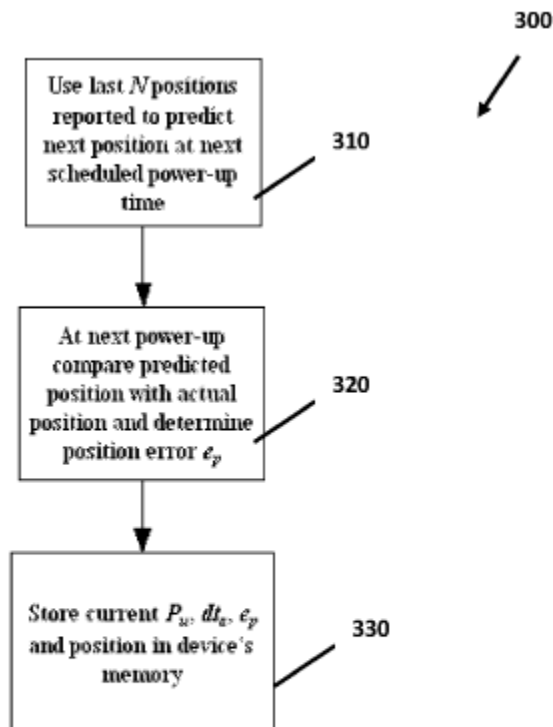


FIG. 3 (Amended)

to predict the next position at the next scheduled power-up time.” *Id.* 7:1-3. Next, at step 320 the predicted position is compared with the actual position of the mobile device at the next power-up time, resulting in the determination of the position error

(e_p). *Id.* 7:8-11. At step 330, the current values of P_u , dt_a , and e_p are stored. *Id.* 7:14-16. The mobile device may also measure the acquisition time (dt_a), from the onset of power-up, to obtain a GPS fix. *Id.* 7:19-21

The stored position error values (e_p) are used to determine the optimal adjustment of the P_u within an acceptable error bound (a_c). *Id.* 7:23-25. An adaptive system can be designed to determine “the best functional fit” for $P_u(e_p)$. *Id.* 7:25-27. Based on the acceptable error bound (a_c) and the current best estimate of the function $P_u(e_p)$, the value of P_u is adjusted and set using $P_u(a_c)$. *Id.* 7:29-31. A weighted contribution of $P_u(a_c)$ can be allowed, with the new power-up period ($wP_u + (1-w)P_u(a_c)$) determined by a “weighting factor [w] in the range 0-1.” *Id.* 7:35-37.

C. Application Scenarios

The adaptability of SM-GPS applies across various application scenarios. *Id.* 9:15-35. In critical instances like E-911, the mobile device orchestrates automatic GPS device activation, circumventing cold starts. *Id.* 9:15-18. During GPS unavailability in emergencies, the device relays the last predicted GPS position. *Id.* 9:20-23. For continuous position requests, particularly in tracking applications, the SM-GPS algorithm dynamically tailors P_u to identify the most consistent value. *Id.* 9:27-30. This obviates manual estimation, facilitating self-adjustment to evolving conditions. *Id.* 9:31-35.

Figure 4 illustrates an embodiment of a method for adjusting the value of P_u

and setting a new GPS power-up period for the mobile device. *Id.* 7:38-40.

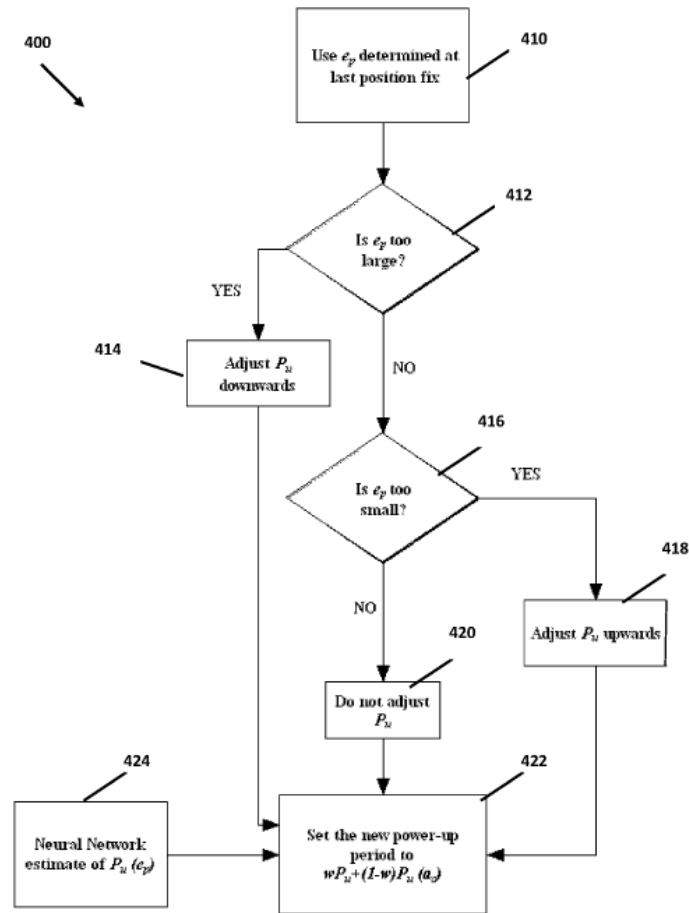


FIG. 4 (Amended)

The process decreases P_u if the position error value (e_p) is too large and increases P_u if the position error is too small, and makes no adjustment to P_u if the positioner error is just right. 7:42-8:11.

Figure 5 illustrates another embodiment of a process for adjusting the P_u based on the GPS acquisition time (dt_a). *Id.* 8:24-35.

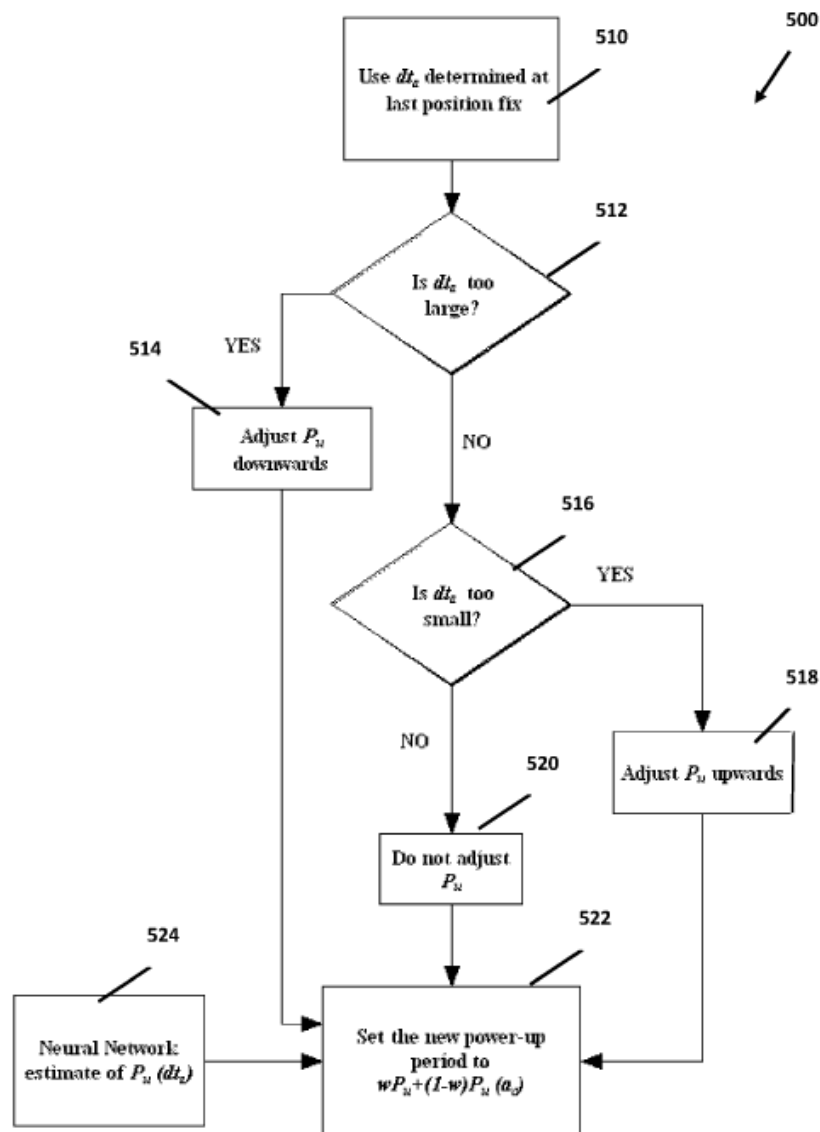


FIG. 5 (Amended)

If the acquisition time is too large, P_u is adjusted downward, if it is too small then P_u is adjusted upwards, and if neither is the case then P_u is not adjusted. *Id.* 8:32-9:7.

The '206 Patent also discloses considering both position accuracy and acquisition time simultaneously, with the algorithms disclosed by Figures 4 and 5

being performed simultaneously and independently. *Id.* 9:8-12. In this implementation “[t]he smaller of the two new values of the power-up period reported by the algorithms [is] utilized as the final new value.” *Id.* 9:12-14.

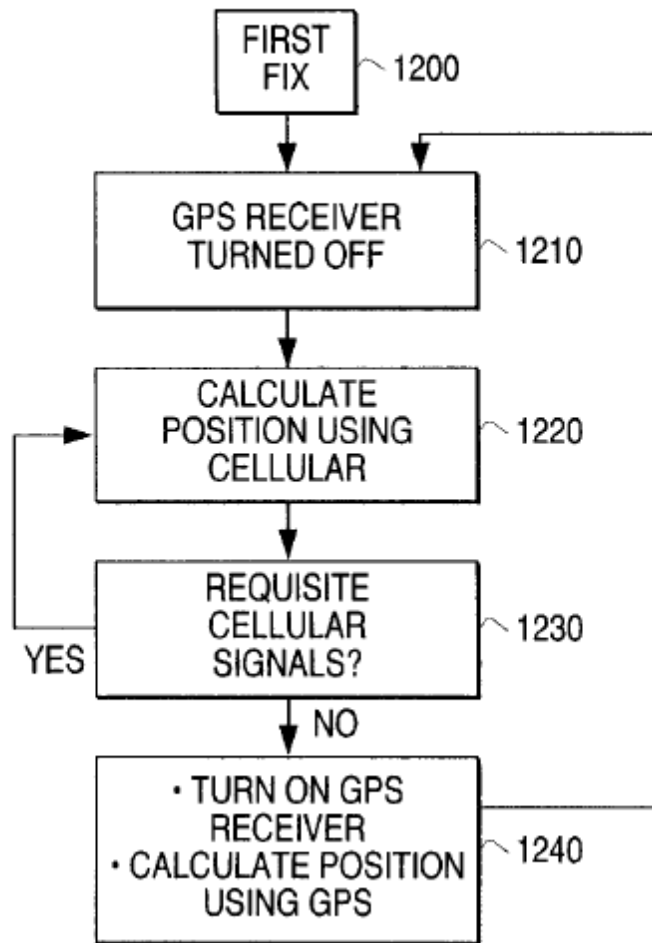
III. OVERVIEW OF THE CITED REFERENCES

A. Watters

Watters generally concerns a combination of “[a]spects of global positioning system (GPS) technology and cellular technology [] in order to provide an effective and efficient position location system.” Ex. 1005 at Abstract. One aspect of Watters concerns “a position location system that makes use of a position location scheme using the cellular network infrastructure and a GPS location system as appropriate to minimize power consumption in the terminal.” *Id.* at 7:27-31.

Watters “minimizes power consumption” by selectively turning its GPS receiver on and off depending on whether the mobile device can obtain a position from a cellular network. *Id.* at Fig. 12; 22:36-56. Watters specifically makes a determination of whether there are “requisite cellular signals” to “calculate position using cellular” in determining whether to turn its GPS receiver on:

FIG. 12



Ex. 1005 at Fig. 12.

In order to determine if it has “requisite cellular signals” at step 1230 of Fig. 12, Watters discloses “[a]t block 1230, a determination is made whether the requisite number of signals in the cellular network infrastructure are available for calculating position (e.g., three signals in the TDOA approach). If so, then block 1220 is repeated. If not, then at block 1240, the GPS receiver is turned on and the position is calculated using GPS.” Ex. 1005 at 22:50-56. Watters additionally says

that the inquiries at block 1230 can include “[a] determining how long (in time) it has been since the last GPS update and/or how far (in space) the mobile terminal has moved since the last GPS update. If a predetermined amount of time has passed, such as two minutes, or the mobile terminal has moved a predetermined distance, such as 100 meters, then a GPS update would be called for and the process proceeds to block 1240.” *Id.* 22:58-64.

B. Nohara

Nohara concerns “a positioning apparatus, a positioning method, and a positioning system which can determine the position of a mobile station with higher precision and ensure adaptability, for example, to mobile communications environments, navigation environments, and the like which are becoming diversified.” Ex. 1006 at [0021]. Nohara discloses that its objective is accomplished by “radio waves coming from a plurality of base stations arranged within a communication area.” *Id.* at [0022].

C. Lau

Lau concerns methods and systems for position acquisition and in particular “improved techniques for acquisition of position information.” Ex. 1007 at Abstract; 1:54-56. Lau discloses periodically acquiring position information based on the use of information about motion or after a certain period of time. *Id.* Figs. 3-6. Motion, per Lau, is “one or a combination of physical conditions on a mobile device, such as

acceleration, velocity, force, vibration, etc.” *Id.* 7:32-35. Lau’s motion information or determination that motion events have occurred is performed by the mobile device using a motion monitoring unit 210 which resides in the mobile device. *Id.* at 7:28-30. In some embodiments, Lau discusses returning the GPS receiver of a mobile device to a low power state.

IV. LEVEL OF ORDINARY SKILL IN THE ART

Patent Owner generally concurs with Petitioners that a person of ordinary skill in the art (“POSITA”) would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience in the research, design, development, and/or testing of GPS and/or cellular positioning devices and techniques, and related firmware and software, or the equivalent, with additional education substituting for experience and vice versa. Ex-1002 ¶¶33-69.

V. CLAIM CONSTRUCTION

Petitioners argue for construction of two terms. Pet. at 8–11. Patent Owner proposes construing an additional term: “a position error of said mobile device determined from the wireless communications network.”

A. Claim 40: “means for determining when said embedded GPS module should be powered on, said embedded GPS module then being powered on dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS”

Patent Owner does not dispute Petitioners’ identified recited function and corresponding structure for this term. Pet. at 8-11.

B. Claims 37, 40, and 43: “at least one of a current radio position and a position error of said mobile device”

Petitioner argues that this term may be interpreted “disjunctively” or “conjunctively.” Pet. at 11-12. Patent Owner believes this term should be interpreted according to the “disjunctive” interpretation provided by the Petition.

C. Claims 37, 40, and 43: “a position error of said mobile device determined from the wireless communications network”

Patent owner believes the term “position error” should be given its plain and ordinary meaning, that is a measurement of error measured in units of distance. The ’206 Patent defines “position error” as “the error between the predicted position of the mobile device and that of the actual position . . .” Ex. 1001 6:35-37. A POSITA would understand that “position error” has a dimension, and that the units of that dimension are units of distance. Ex-2001 ¶20. Conventionally, “position error” is measured with units of distance. *Id.* The use of the phrase position error in the ’206 Patent is consistent with the conventional use of “position error.” For example, the ’206 Patent discloses “the difference between a predicted position and the

actually position measured at time t can be used to formulate the position error.” Ex-1001 at 6:43-46. A “difference” between two positions is expressed in units of distance. Ex-2001 ¶21. Additionally, during prosecution of the original patent of which the ’206 Patent is a reissue, U.S. Patent No. 8,022,870 (’870 Patent), the applicant and inventor, Dr. Robert Malaney, characterized position error as having units of distance. Ex-2002 at pp. 303-04, November 7, 2010 Response and Amendment. In particular, the inventor provided a “real-world example” of using position error reported by a wireless network to control GPS power supply. *Id.* In this example, the inventor characterized position error as follows “[i]magine the mobile application requires only a 100-meter location accuracy . . . If the reported error was less than 100 meters, the GPS power would not be turned on.” *Id.*

Accordingly, a POSITA would understand from the disclosure of the ’206 Patent, and from the inventor’s characterization of the claims of the ’870 Patent in the file history, that “position error” refers to the conventional position error, having units of distance. Ex-2001 ¶¶22-23.

Claims 37, 40, and 43 also require that position error is “determined from the wireless communications network.” A POSITA would understand that such a determination involves a calculation of the position error. *Id.* at ¶24. And that a mere statistical characterization of possible errors does not provide sufficient information for the position error to be “determined from the wireless communications network.

Id. at ¶¶24, 54-56.

VI. GROUND 1: WATTERS DOES NOT ANTICIPATE OR RENDER ANY CLAIM OBVIOUS

A. Watters Fails to Disclose or Render Obvious Limitations 37[b]/40[c]/43[c]

37[b]/40[c]/43[c] said determining when said embedded GPS module should be powered on being dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS

Patent Owner does not dispute that Watters generally teaches that mobile device position can be determined from cellular signals, or that Watters discusses position measurement may have varying degrees of accuracy. *See e.g.*, Ex-1005 22:25-46; 23:1-20; 24:5-14. However, Watters does not teach using either of these to determine “when said embedded GPS module should be powered on” as required by the claims. Watters teaches powering on a GPS receiver based on one of only three criteria: whether a position can be determined, how far a receiver has moved, or how much time has passed since the last GPS position fix. Ex. 1002 at ¶¶ 106-108.

1. Watters’ does not disclose “determining when said embedded GPS module should be powered on being depending on . . . a position error of said mobile device determined from the wireless communications network”

The only portion of Watters that Petitioners identify as disclosing “position

error” is step 1230, “Requisite Cellular Signals?” of Fig. 12 of Watters. Petitioners argue that “step 230 determines whether that cellular position signal has the requisite accuracy for continued use.” Pet. at 28. Watters states that Step 1230 is merely a determination of whether sufficient cellular signals exist to calculate a position using cellular in step 1220. “At block 1230, a determination is made whether the requisite number of signals in the cellular network infrastructure are available for calculating position (e.g., three signals in the TDOA approach).” Watters at 22:50-54. This is not determination of a position error at least because position error is measured in unites of distance. Ex-2001 at ¶25. Additionally, if there are not sufficient cellular signals to calculate a position, the position error also could not be calculated. *Id.*

At step 1230 all Watters does is determine the number of signals that are present. Ex-1005 22:50-54. If this number is less than a certain value, three in the embodiment described in Watters, then Watters turns on the GPS receiver. Without more, the number of signals is not sufficient to determine a position error. Ex-2001 at ¶26.

The Petition’s reliance on Watters other discussion of “multi-path errors” and that “less frequent updates needed if ... cellular network infrastructure signals are known to be of good accuracy,” Pet. at 30-31, is likewise flawed. While Watters may generally disclose that signals “known” to have high accuracy produce a need for less frequent updates, Watter does not disclose making a determination of *when to*

power on an embedded GPS receiver depending on *a position error* of said mobile device determined from the wireless communications network. Such a determination of when to power on the GPS receiver would require a measurement or determination of what the position error is. Ex-2001 ¶27. However, Watters does not disclose determining the position error of a mobile device from the wireless communications network. Instead, at best, Watters discloses that some areas or signals may be known to have lower or higher accuracy, without any quantification of what the error may be that that impacts said accuracy. *Id.*

In essence, Petitioners argue that because Watters teaches that some signals have error, a POSITA would recognize that Watters discloses or renders obvious using position error to determine when to turn a GPS module on. First, there is no evidence that the reference to “accuracy” in Watters is analogous to the claimed *position error*. Moreover, the mere fact that a reference acknowledges the existence of a quantity, like “error” does not disclose using that quantity in a specific manner nor does it render it obvious to do so. Here, Watters only discloses two specific measurements that are used to determine whether to power on Watters’ GPS receiver: a distance moved or an amount of time passed since the last GPS update. Ex-1005 22:57-64. These are decidedly different than using a position error to determine when to turn on a GPS module because neither provides an estimate of what the actual error is measured in units of distance. Ex-2001 ¶¶27-30.

2. Watters' disclosure of "how far (in space) the mobile terminal has moved" does not disclose "a current radio position . . . determined from the wireless communications network."

Petitioners argue that "Watters teaches dependency on 'current radio position' because it discloses determining 'how far (in space) the mobile terminal has moved since the last GPS update.'" Pet. at 29. According to Petitioners, "determining 'how far' a device has traveled requires knowing the starting position and the current position at the time the determination is made." Pet. at 30. This is not true. Determination of how far something has traveled can be calculated simply by multiplying its velocity by the time it has traveled. Ex-2001 ¶¶31-34. Watters explicitly discloses using a time between the last GPS measurement as a basis for powering Watters' GPS receiver on. Ex-1005 22:57-59. Determination of distance traveled is not the same as determining a current position. Stated otherwise, one can decipher the distance a mobile object has travelled between two points by multiplying the mobile object's velocity by the travel time. However, this analysis sheds no light on the direction of travel and hence, the "current position" of the mobile object remains unknown.

Further, methods of calculating distance moved that did not require a current radio position determined from the wireless communications network were well known to a POSITA at the time Watters was filed. For example, Doppler shift of a radio signal can be used to determine velocity without determining a mobile device's

current radio position. Ex-2001 ¶35. Additionally, the incorporation of accelerometers in mobile devices could be used to determine distance moved with no need for knowledge of starting position because accelerometers only provide information relative to when the mobile device beings moving. Ex-2001 ¶36.

Watters likely suggests using either a fixed time interval or a distance traveled to provide a way to account for changes in the rate of movement of a mobile device. For a fast-moving mobile device, turning the GPS receiver on after traveling a certain distance may have been more desirable than waiting a fixed period of time. Ex-2001 ¶37. Faster moving mobile devices could be turned on more frequently and thus produce more accurate position determinations from GPS than by simply waiting the same amount of time between GPS measurements. *Id.*

However, turning on GPS in this manner when a mobile device has covered a certain amount of distance is not the same as using “a current radio position . . . of said mobile device determined from the wireless communications network” to determine when to power on a GPS module.

In fact, Watters discloses calculating a position using cellular at step 1220 of Figure 12, it does not disclose using this position to determine when to turn on its GPS receiver. Instead, Watters suggests that as long as its system can determine a position from the cellular network, it should, and that it should only turn the GPS on when it cannot establish a position using the cellular network at step 1230.

Accordingly, Watters' disclosure of using a distance moved to power on its GPS receiver does not disclose using "a current radio position . . . determined from the wireless communications network" as required by the independent claims.

B. Watters Fails to Disclose or Render Obvious Claims 39/42/45

39/42/45: [The method according to claim 37], wherein said determining when said embedded GPS module should be powered on is also dependent on at least one of; a last satellite position; a last position determined by the GPS; and a last time determined by the GPS.
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Claims 39, 42, and 45 require that the "determining when said embedded GPS module should be powered" is dependent on at least one of "a last satellite position; a last position determined by the GPS; and a last time determined by the GPS " *in addition to* being dependent on "at least one of a current radio position and a position error of said mobile device determined from the wireless communications network" required be claim elements 37[b]/40[c]/43[c].

The Petition argues that Watters teaches that using a distance move would include using the last GPS-determined position. However, as explained above, a distance moved is "relative" and can be determined without using any position measurements at all, either from the GPS or from the non-GPS "wireless communications network" recited by the independent claims of the '206 Patent. Additionally, Watters discloses that using distance moved or time since the last position fix are *alternatives*. Ex-1005 22:57-64. Therefore, even if Watters'

determination whether adequate cellular signals are available in step 1230 is considered to be a “position error” (it is not), Watters’ provides no teaching or motivation to use the alternative inquiries for step 1230 *in addition to* the primary inquiry illustrated in Fig. 12 of Watters.

Finally, Watters does not teach utilizing a “last satellite position” in addition to “at least one of a current radio position and a position error. . .” Watters does not discuss measuring or recording GPS satellite position at all, and the Petition does not cite to any portion of Watters as explicitly describing such. Pet. at 36-37. Instead, the Petition argues that “the last position determined by the GPS is also dependent on the position of at least four GPS satellites, so it is also based on ‘a last satellite position’ as well.” *Id.* This is incorrect. Logically, the Petition appears to be arguing that “the last position determined by the GPS” would change if the GPS satellite positions change, but this is not the case. GPS satellites are constantly moving and the position of a mobile device can be determined from GPS satellites regardless of the satellites’ position. Ex-2001 ¶¶38-39. For this reason, Watter’s disclosure of a previous position determined by GPS does not inherently include a determination of the last GPS satellite position. *Id.* ¶40.

VII. GROUND 2: NOHARA DOES NOT ANTICIPATE OR RENDER ANY CLAIM OBVIOUS

A. Nohara Fails to Disclose or Render Obvious Limitations 37[b]/40[c]/43[c]

37[b]/40[c]/43[c] said determining when said embedded GPS module should be powered on being dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS

With respect to limitation 37[b], the Petition argues that “Nohara teaches the claims under the ‘disjunctive’ interpretation discussed in Section X.B above, because it uses an alleged ‘position error’ to determine when to switch from cellular based positioning and power on GPS-based positioning.” Pet. at 46. The Petition relies on the combination of Nohara and Watters to teach the “conjunctive” interpretation of limitation 37[b], Pet. n14, (i.e. that “determining when said GPS module should be power on” is dependent on both “current radio position” and “position error”). The Petition does not at any point argue that Nohara discloses, teaches, or otherwise suggests determining a GPS module’s power state based on only “current radio position.” *Id.* 45-52.

Accordingly, the Petition concedes that Nohara does not teach using a “current radio position . . . of said mobile device determine from the wireless communications network” to determine when the embedded GPS module should be powered on.

1. Nohara's Disclosure of "HDOP" Does Not Disclose or Render Obvious Limitation 37[b]/40[c]/43[c]

Although Nohara refers to HDOP as a "position error" a POSITA would understand that HDOP and "position error" as the term is used in the claims are not equivalent. Ex-2001 ¶41. The petition leans heavily on a single sentence of Nohara that states "[t]he value HDOP shall be regarded as the positioning error quantified on the plane in the horizon system of coordinates" (Ex-1006 ¶144) without explaining what aspects of wireless positioning that HDOP actually represents. Pet. at 48.

HDOP is not a measurement of position error but instead relates errors in range measurements needed to determine a position to the error in that determine position. Ex-2001 ¶43. HDOP is calculated using entries in a covariance matrix that describes how range errors and user-to-transmitter geometry combine in a system, such as GPS or cellular networks. *Id.* ¶44. HDOP is conventionally calculated based only on the geometry between the mobile device and the transmitters (e.g. GPS satellites, cellular base stations, or other radio transmitters). *Id.* ¶45. This geometry matrix is dimensionless and referred to as "*A*" in Nohara. *Id.* HDOP is consequently calculated from the "pseudoinverse" of the geometry matrix. *Id.* ¶46.

Nohara definition of HDOP appears consistent with the conventional, unitless definition of HDOP. *Id.* ¶¶47-48. However, Nohara also discloses as single equation (Ex-1006 ¶141, equation (9)) that is inconsistent with the conventional unitless

definition of HDOP. *Id.* at ¶¶49-50. However, whether Nohara's HDOP is dimensionless or is "weighted" to be presented in units of distance, it is fundamentally only a statistical distribution of possible position errors from which position error cannot be "determined" as required by the Claims. *Id.* ¶51

Even if Nohara's HDOP is "weighted" to express the statistical distribution of position errors in units of distance, a POSITA would understand that Nohara's HDOP would require additional measurements of signal errors to calculate the claimed position error in addition to HDOP. *Id.* ¶¶52-53, 56. HDOP, at most, only provides a distribution of possible position errors, which can vary widely for a particular HDOP. *Id.* ¶56.

Studies into the relationship between HDOP and position error are ongoing. *Id.* ¶54; Ex-2003 (*Experimental Studies on The Relationship Between HDOP and Position Error in the GPS System*). POSITAs routinely refer to HDOP and position error as separate measurements. *Id.* Position errors can differ for the same HDOP value, and large HDOP values may nonetheless result in small position errors and vice versa. Ex-2001 ¶56. Because the relationship between HDOP and position error is not determinative, position error and HDOP cannot be simply substituted for one and other. *Id.* ¶¶56-58. As such, a POSITA would recognize that Nohara's use of HDOP in determining when to power on Nohara's GPS receiver is the equivalent of using the base station geometry to determine when to power on that receiver.

Because circumstances can arise where the geometry of the base station arrangement is “bad” but the position error is still low, a POSITA would recognize that “determining when said embedded GPS module should be powered on being dependent on . . . a position error of said mobile device determined from the wireless communications network” is not the same as using a measurement of HDOP to determine when to power on a GPS receiver. *Id.* Likewise, a POSITA would not find it obvious to substitute position error for HDOP because there is not a direct, predictable relationship between the two measurements. *Id.* ¶58.

For at least these reasons, Nohara does not anticipate or render obvious the claims of the '206 Patent.

VIII. GROUND 3: CLAIMS 38, 41, AND 44 ARE NOT OBVIOUS OVER WATTERS IN VIEW OF LAU

Because, as explained above, Watters does not anticipate or render obvious independent claims 37, 40 or 43, Watters in view of Lau cannot render dependent claims 38, 41, and 44 obvious. Lau does not disclose that which Watters and Nohara lack. Specifically, Lau does not address Watters' deficiencies as to the independent claims that are explained above, and the Petition does not allege that it does.

IX. GROUND 4: CLAIMS 37-45 ARE NOT OBVIOUS OVER WATTERS AND NOHARA

Because, as explained above, the HDOP of Nohara is not a position error

as a POSITA would understand the term, neither Watters nor Nohara, alone or in combination, anticipates or render obvious Claims 37-45 under a “disjunctive” interpretation of the claims. Accordingly, using the process illustrated by Watters’ Figure 12 with Nohara’s HDOP, as suggested by the Petition (Pet. at 56-57, 64) does not render obvious independent claims 37, 40 or 43.

X. GROUND 5: CLAIMS 38, 41, AND 44 ARE NOT OBVIOUS OVER WATTERS AND NOHARA IN VIEW OF LAU

Because, as explained above, independent claims 37, 40 and 43 are not obvious in view of either Watters nor Nohara alone or in combination, Watters and Nohara in view of Lau cannot render dependent claims 38, 41, and 44 obvious for at least the same reasons. Lau does not address Watters’ and Nohara’s deficiencies as to the independent claims that are explained above, and the Petition does not allege that it does.

XI. CONCLUSION

Because neither Watters nor Nohara, alone or in combination, teach, disclose, or suggest “determining when said embedded GPS module should be powered on being dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS” as recited by claim elements 37[b], 40[c], and 43[d], the Petitioners have not shown the claims of

the '206 Patent to be anticipated or obvious by a preponderance of the evidence.

Dated: July 5, 2024

Respectfully submitted,

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Dated: July 5, 2024

/s/ Steven T. Jogle
Steven T. Jogle

CERTIFICATE OF SERVICE

The undersigned certifies that on the fifth day of July, 2024, a complete and entire copy of the foregoing “PATENT OWNER’S MANDATORY NOTICES,” including exhibits, if any, was served on the date below on the following counsel of record via email per Petitioners’ consent to electronic service, see Paper 1 at 3:

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