

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC.; SAMSUNG ELECTRONICS CO., LTD.; AND
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner

v.

NARISTE NETWORKS PTY. LTD.
Patent Owner.

Case No. IPR2023-01374
U.S. Patent No. RE48,206

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. RE48,206**

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Ex-1005	U.S. Patent No. 5,982,324 to Watters (“Watters”)
Ex-1006	U.S. Patent Publication No. 20020151314 to Nohara (“Nohara”)
Ex-1007	U.S. Patent No. 6,975,941 to Lau (“Lau”)
Ex-1008	INTENTIONALLY LEFT BLANK
Ex-1009	INTENTIONALLY LEFT BLANK
Ex-1010	INTENTIONALLY LEFT BLANK
Ex-1011	INTENTIONALLY LEFT BLANK
Ex-1012	INTENTIONALLY LEFT BLANK
Ex-1013	INTENTIONALLY LEFT BLANK
Ex-1014	INTENTIONALLY LEFT BLANK
Ex-1015	INTENTIONALLY LEFT BLANK
Ex-1016	INTENTIONALLY LEFT BLANK
Ex-1017	INTENTIONALLY LEFT BLANK
Ex-1018	INTENTIONALLY LEFT BLANK
Ex-1019	INTENTIONALLY LEFT BLANK

¹ Four-digit pin citations that begin with 0 are to the page stamps added by Google and Samsung in the bottom right corner of the exhibits. All other pin citations are to original page, column, paragraph, and/or line numbers.

Ex-1020	Claim Mapping Table
Ex-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
Ex-1022	Yilin Zhao, Vehicle Location and Navigation Systems 43–81 (Illustrated ed. 1997).
Ex-1023	U.S. Patent No. 5,592,173 to Lau et al (“Lau”)
Ex-1024	U.S. Patent No. 6,748,224 to Chen et al (“Chen”)
Ex-1025	U.S. Patent No. 6,889,053 to Chang et al (“Chang”)
Ex-1026	U.S. Patent No. 5,663,734 to Krasner et al (“Krasner”)
Ex-1027	U.S. Patent No. 5,594,453 to Rodal et al (“Rodal”)
Ex-1028	U.S. Patent No. 7,409,188 to Syrjarinne et al (“Syrjarinne”)
Ex-1029	U.S. Patent Publication No. 20050083230 to Harvey et al (“Harvey”)
Ex-1030	Xinrong Li, Kaveh Pahlavan, and Jacques Beneat, Performance of TOA estimation Techniques in Indoor Multipath Channels 911–915 (2002).
Ex-1031	Flowchart, https://en.wikipedia.org/w/index.php?title=Flowchart&oldid=1169392868 (last visited Aug. 30, 2023).
Ex-1032	Central processing unit, https://en.wikipedia.org/w/index.php?title=Central_processing_unit&oldid=1172444772 (last visited Aug. 30, 2023)
Ex-1033	Samir S. Soliman and Charles E. Wheatley, Geolocation technologies and applications for third generation wireless 229–251 (2002).
Ex-1034	Samir Soliman, Parag Agashe, Ivan Fernandez, Alkinoos Vayanos, Peter Gaal, and Milan Oljaca, gpsOne™: A hybrid position location system 330–335 (2000).
Ex-1035	A. M. Turing, On Computable Numbers, With an Application to the

	Entscheidungsproblem 230–265 (1936).
Ex-1036	Defendants’ Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a)
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Ex-1040	Plaintiff’s Disclosure of Asserted Claims and Infringement Contentions and Identification of Document Production Accompanying Disclosure

I. INTRODUCTION

Google LLC; Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc. (collectively, “Petitioner”) request inter partes review (“IPR”) of Claims 37-45 of U.S. Patent No. RE48,206 (“the ’206 Patent”) (Ex-1001), currently assigned to Nariste Networks Pty. Ltd. (“Patent Owner”).

The ’206 Patent purports to relate “generally to GPS [Global Positioning System] acquisition and in particular to power conservation for GPS-enabled devices.” Ex-1001, 1:22-24. In particular, the patent discloses “a method of acquiring GPS on a mobile device possessing GPS capability.” *Id.*, 2:58-59. The claims are generally directed to acquiring a device’s position using non-GPS, terrestrial-based techniques such as cellular network infrastructure, and then selectively switching on a GPS receiver to improve the accuracy of the position determined by the non-GPS-based technique. The purpose of this switch-over is to conserve battery power since terrestrial positioning approaches use less power than GPS-based approaches.

The prior art shows that the claims are directed to routine design choices for addressing well-known issues relating to GPS-enabled mobile devices. For example, the prior art describes known navigation systems that switched between using GPS and wireless network sources, to optimize between location accuracy

and power savings. Claims 37-45 of the '206 Patent would thus have been obvious as set out in this Petition.

II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

Real Parties-in-Interest: Petitioner identifies the following real parties-in-interest: Google LLC.; Samsung Electronics Co., Ltd.; and Samsung Electronics America, Inc.

Related Matters: Patent Owner has asserted the '206 Patent against Co-Petitioner Samsung in *Nariste Networks Pty. Ltd. v. Samsung Elecs. Co., Ltd., et al.*, No. 2:23-cv-00031 (E.D. Tex.). Co-Petitioner Google has not been named in, and is not a party to, that litigation.

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Service Information: Petitioner consents to electronic service by email to OMMNariste@omm.com and the email addresses for the above-listed counsel.

Please address all postal and hand-delivery correspondence to lead counsel at O'Melveny & Myers LLP, 400 South Hope St., Los Angeles CA, with courtesy copies to the email address identified above.

III. FEE AUTHORIZATION

Pursuant to 37 C.F.R. §42.15(a) and §42.103(a), the PTO is authorized to charge any and all fees to Deposit Account No. LA500639.

IV. GROUNDS FOR STANDING

Petitioner certifies that the '206 Patent is available for IPR, this Petition is timely filed, and Petitioner is not barred or estopped from requesting IPR on the grounds presented.

V. PRECISE RELIEF REQUESTED

Petitioner requests cancellation of Claims 37-45 of the '206 Patent under 35 U.S.C. § 103 on the following grounds:

- **Ground 1:** Claims 37-45 are rendered obvious by U.S. Patent No. 5,982,324 to Watters ("Watters," Ex-1005).
- **Ground 2:** Claims 37, 40, and 43 are rendered obvious by U.S. Patent Publication No. 2002/0151314 to Nohara ("Nohara," Ex-1006).
- **Ground 3:** Claims 38, 41, and 44 are rendered obvious by Watters in

view of U.S. Patent No. 6,975,941 to Lau (“Lau,” Ex-1007).

- **Ground 4:** Claims 37-45 are rendered obvious by Watters in view of Nohara.
- **Ground 5:** Claims 38, 41, and 44 are rendered obvious by Watters in view of Nohara and Lau.

The Petition discusses rationales for each of the above enumerated grounds and is supported by a declaration from Mr. Scott Andrews (Ex-1002).

VI. THE CHALLENGED PATENT

The '206 Patent relates to power conservation for GPS-enabled devices. Ex-1001, 1:22-24. Because continuous use of GPS positioning uses significant power in a GPS-equipped mobile device, the patent provides “a system for adaptively predicting when a GPS-enabled wireless communication device should be powered on.” Ex-1001, 3:40-44; *see also id.* 2:11-13 (battery power is precious). As reflected in Figure 2, when not using GPS, GPS power-on timing 240 may be predicted “using adaptive-filters [including neural networks] and machine-learning techniques.” *Id.*, 5:62-65, 6:41-43 (adaptive filter technique based on neural network).

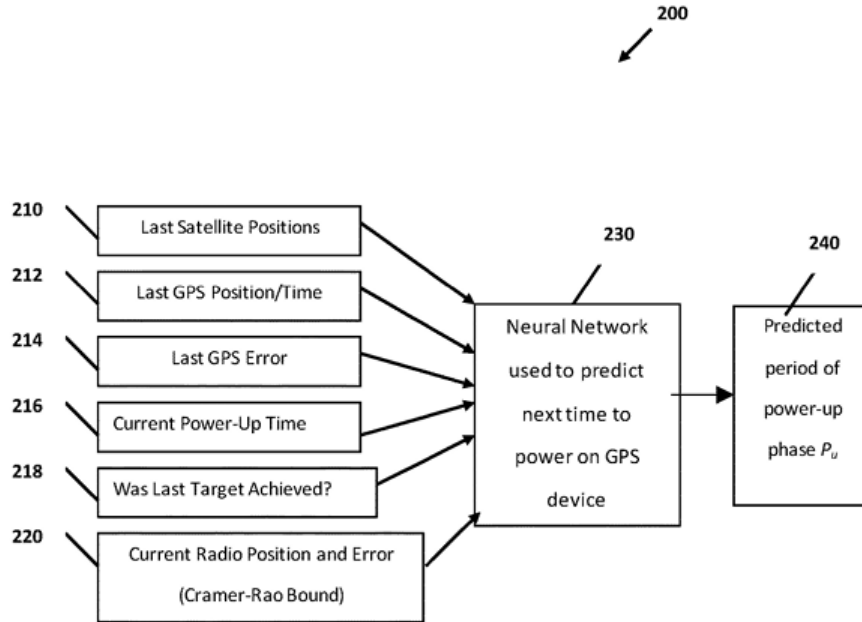


FIG. 2 (Amended)

Id., Fig. 2. For example, the '206 Patent explains that “neural network module 230 predicts the next time to power on the GPS device” and does so “dependent upon various inputs including the last satellite positions 210, the last GPS position/time 212, the last GPS error 214, the current power-up time 216, information about whether or not the last target [] was achieved 218, and the current radio position and error 220.” *Id.*, 6:55-62. As discussed below, no reissued claims relate to any such adaptive filters, adaptive predictions, or neural networks.

The '206 Patent is a re-issue patent. During the reissue proceedings, all original claims were cancelled and new Claims 37-45 were added. The reissued independent claims broadly recite the use of information “determined from the

wireless communications network, said wireless communications network being different from said GPS” to make a determination of when to power on the GPS. Ex-1001, 16:18-20. The reissued claims thus require that the power on determination is based on information from a wireless communication network, such as cellular infrastructure, rather than GPS-provided information. As discussed in further detail below, the challenged claims are obvious over prior art describing the same capabilities.

VII. PATENT PROSECUTION HISTORY

The ’206 Patent is an indirect reissue of US Patent No. 8,022,870 (“the ’870 Patent”), which was filed as App. No. 11/661,707 and originally issued on September 20, 2011. Ex-1001, Cover.

The ’206 file history is submitted as Ex-1004. The application for the ’206 Patent, Application No. 15/376,627 (“’627 application”), was filed on December 12, 2016. The applicant filed a re-issue declaration, affirming that the original patent was “wholly or partially inoperative or invalid” “by reason of the patentee claiming more or less than he had a right to claim.” Ex-1004, 0230. The applicant further explained that broader new Claims 37-45 are presented “thus broadening the original scope of the invention.” *Id.*, 0229. The applicant cancelled Claims 1-36. *Id.*, 0019-0022.

On July 15, 2020, the Examiner issued a notice of allowance stating that the previously applied prior art “does not explicitly teach the use of a position determined from the wireless communications network, wherein the wireless communications network is different from the GPS.” Ex-1004, 0371. The Examiner explained that “[i]n the [applied prior art] system, all positions are derived from the GPS.” *Id.*

VIII. LEVEL OF ORDINARY SKILL IN THE ART

One of ordinary skill in the art 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.

IX. PRIORITY DATE

The earliest possible priority for the '206 Patent is an Australian patent application, AU 2004905024, filed on September 2, 2004. Petitioner takes no position on the proper priority date for each claim of the '206 Patent because all prior art references asserted in this petition are U.S. patents or patent publications

that were published and/or filed before the earliest possible priority date of the '206 Patent.²

X. CLAIM CONSTRUCTION

Petitioner interprets the claims of the '206 Patent according to the *Phillips* claim construction standard. 37 C.F.R. § 42.100(b). Claim 40 recites a “means” element, creating a rebuttable presumption that it is a means-plus-function element under § 112 ¶6. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015). The 112¶6 construction for the “means” term presented below is applicable only to Claims 40-42.

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”

Recited Function: “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.”

² Petitioner respectfully reserves the right to challenge the priority date in other proceedings, to the extent necessary.

Corresponding Structure³: “Under section 112, paragraph 6, structure disclosed in the specification is ‘corresponding’ structure ‘only if the specification or the prosecution history clearly links or associates that structure to the function recited in the claim.’ A court may not import into the claim features that are unnecessary to perform the claimed function. Features that do not perform the recited function do not constitute corresponding structure and thus do not serve as claim limitations.” *Northrop Grumman Corp. v. Intel Corp.*, 325 F.3d 1346, 1352 (Fed. Cir. 2003). Here, because these reissued claims are substantially different in scope than the original claims, much of the discussion in the specification is directed to unclaimed features and algorithmic steps that do not limit the claims.

The minimum necessary corresponding structure to perform the function recited by the reissued claims is “GPS-capable mobile telephones, laptop computers, Personal Digital Assistants (PDAs), and wireless sensor devices,” Ex-1001, 6:17-19, containing “a CPU ... [or] other processing units capable of

³ Petitioner has identified the closest disclosed structure/algorithmic steps in the ’206 Patent that relate to the recited function, but by doing so Petitioner does not waive any argument that the structure and/or algorithm for performing the claimed function of each term is not sufficiently disclosed in the ’206 Patent. Patent Owner and Co-Petitioner Samsung have not yet submitted claim construction contentions in district court. To the extent the district court provides a determination on this term or others, Petitioner will submit such determination for the record. 37 C.F.R. § 42.100(b). For example, a District Court claim construction order may address Patent Owner’s apparent interpretation that claims should have a “disjunctive” meaning as addressed in Section X.B, which could in turn inform the construction of this term as well.

processing data and carrying out operations,” Ex-1001, 11:63-66, where the CPU is programmed with an algorithm that determines whether a remote terminal’s position error is “too large.” *Id.*, 7:43-45, Fig. 4 (step 412). That is, position and/or position error is compared to a threshold (e.g., acceptable error bound a_c) to determine if it is “too large.” After this threshold determination is made, the specification explains that a power up period, P_u , should be adjusted, resulting in the GPS powering on. *Id.*, 7:45-46. The power up period, P_u , may also be a function of the recited “current radio position,” Ex-1001, 6:62, which the specification describes being determined using any of “a number of techniques.” *Id.*, 7:5-8. Claim 40, however, specifically requires that the determination is made based on position/position error “from the wireless communication network.” Therefore, the algorithm for “determining when said embedded GPS module should be powered on” compares at least one of a position and position error to one or more thresholds (e.g., acceptable error bound a_c), and equivalents. Ex-1002 ¶¶71-78.

In summary:

Function	Corresponding Structure
“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	CPU or other processing unit programmed with a thresholding algorithm to determine when to power on said embedded GPS module based on comparing at least one of a position

determined from the wireless communications network, said wireless communications network being different from said GPS”	and position error to one or more thresholds, and equivalents
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B. Claims 37, 40, and 43: “at least one of a current radio position and a position error of said mobile device”

In the underlying litigation, Patent Owner argues that this term should be interpreted “disjunctively,” such that “at least one of a current radio position and a position error of said mobile device” means at least one of either “current radio position” or “position error.” *See* Ex-1021, 0004. In the context of the surrounding claim language, such as Claim 37’s recitation of “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,” a disjunctive interpretation means that the GPS’s power on state can depend on either quantity: current radio position or position error.

But the term could also be interpreted “conjunctively,” to require both “current radio position” and “a position error,” meaning that the GPS’s power on state must depend on both quantities together. However, the Board need not resolve the alternative “disjunctive” and “conjunctive” constructions (as they will

be referred to throughout this Petition) because the prior art grounds in this petition render obvious the claims under either interpretation.⁴

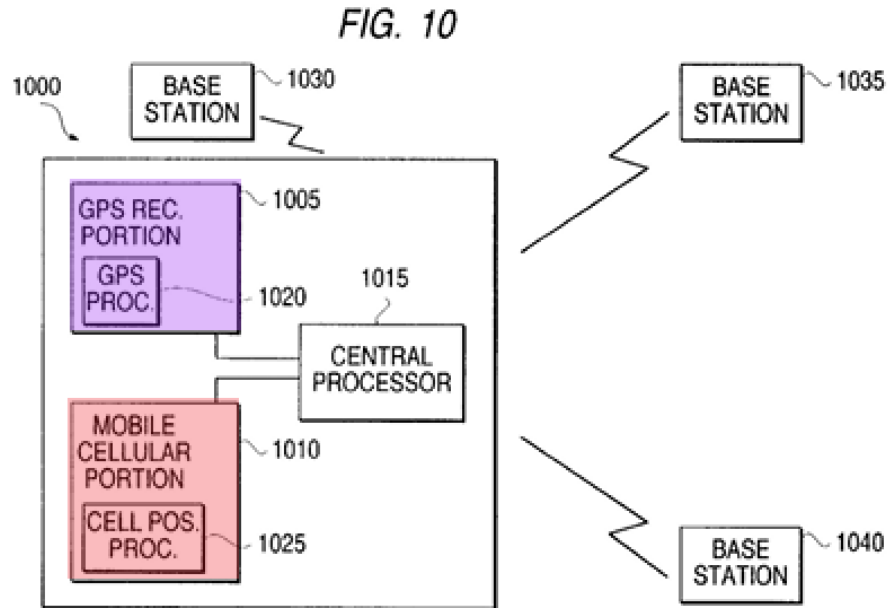
XI. BRIEF DESCRIPTION OF THE APPLIED PRIOR ART REFERENCES

A. Watters (Ex-1005)

Watters, titled “Combining GPS with TOA/TDOA of cellular signals to locate terminal,” was filed on May 14, 1998, and issued as U.S. Patent No. 5,982,324, on November 9, 1999. Watters qualifies as prior art under at least pre-AIA 35 U.S.C. §102(b).

As shown in Figure 10, Watters discloses mobile terminal 1000, which “includes a GPS receiver portion 1005, a mobile cellular portion 1010, and a central processor 1015.” Ex-1005, 19:48-50. Watters explains that “GPS receiver portion 1005 includes a GPS processor 1020 for calculating position, while the mobile cellular portion 1010 contains a cellular position processor 1025 that computes position using the cellular network infrastructure.” *Id.*, 19:54-58.

⁴ As noted above, Patent Owner and Co-Petitioner Samsung have not exchanged claim construction disclosures and Petitioner will apprise the Board of any claim construction determinations made by the district court. *See* 37 C.F.R. § 42.100(b).



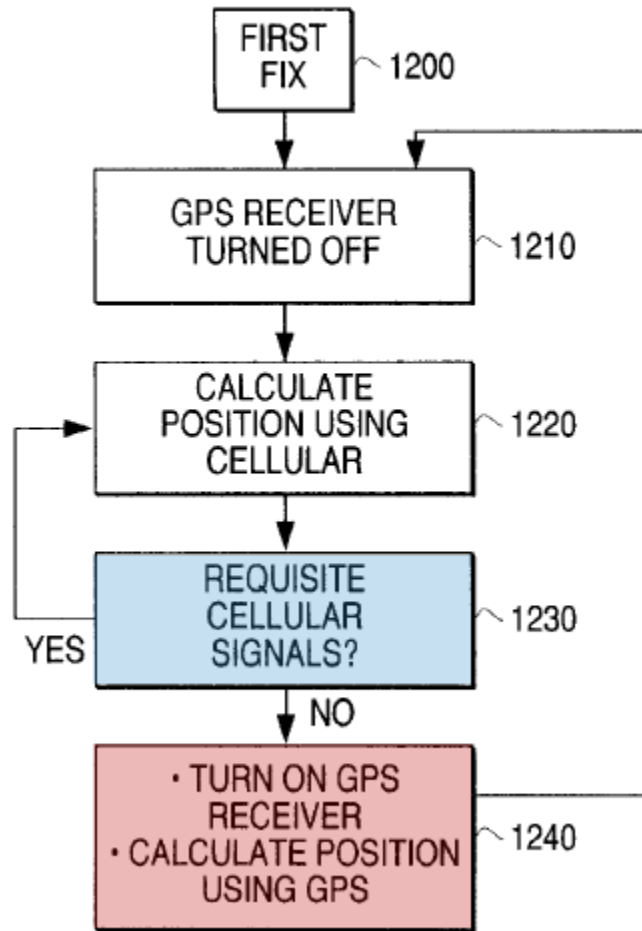
Id., Fig. 10.

Watters also discusses the competing interests of accurate positioning and reducing power consumption. For example, “[t]o save power consumption (i.e., save battery power), it may be desirable to rely on the cellular network infrastructure to calculate position.” Ex-1005, 22:38-40. As shown below, Watters discloses an approach that includes GPS receiver 1000 being turned on and utilized to determine position when “the cellular network infrastructure does not provide the necessary signals to determine position, or if a GPS recalibration was needed.”⁵

Id., 22:41-44.

⁵ Figures 10, 11, and 12 refer to the “third aspect” of Watters’s invention. Ex-1005, 9:21-30. Figure 11 and Figure 12 are two “flowcharts depicting operation of the position location system according to the third aspect,” shown in the block diagram of Figure 10. *Id.* A POSITA would have considered all of these figures and

FIG. 12



Id., Fig. 12.

On the other hand, if “requisite cellular signals” are available at step 1230 (above, blue), then Watters does not proceed to turn on the GPS receiver (step 1240), but proceeds back to step 1220 and continues to use cellular positioning

teachings together, and nothing about them, or Watters’s explanations of them, precludes applying these respective teachings together. Ex-1002, Fn. 16 (citing declaration ¶¶35-69, which provide an overview of the state of the art relating to geolocating at the time of the alleged invention.)

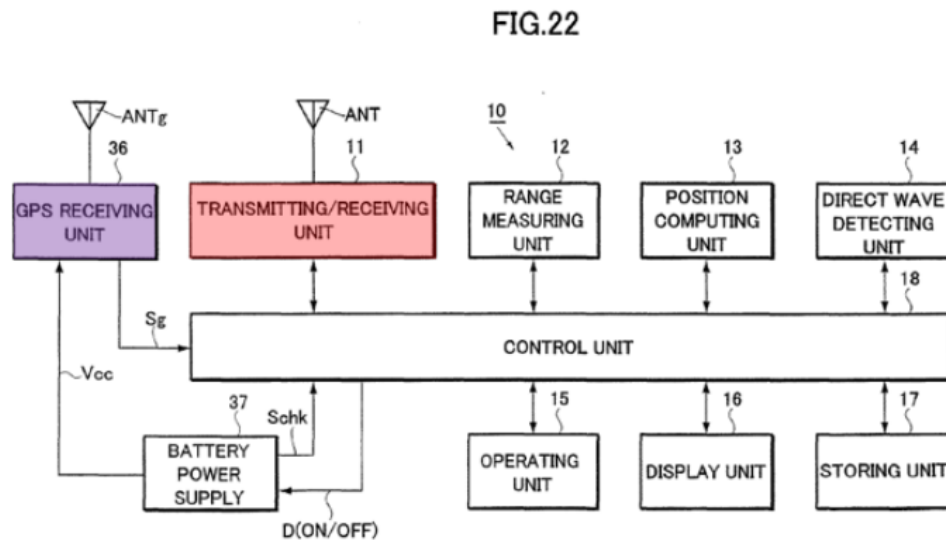
techniques, thus conserving power. Watters also explains that “[a]lternative inquiries at block 1230 include determining how long (in time) it has been since the last GPS update and/or how far (in space) the mobile terminal has moved since the last GPS update.” *Id.*, 22:57-60. For example, Watters discloses that if “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.*, 22:62-64.

B. Nohara (Ex-1006)

Nohara, titled “Positioning apparatus, positioning method, and positioning system,” was filed on February 27, 2002, and issued as U.S. Patent Application Publication No. 2002/0151314, published October 17, 2002. Nohara qualifies as prior art under at least pre-AIA 35 U.S.C. §102(b).

Nohara teaches a “system for determining the present position of a mobile station by using radio waves coming from the mobile station to a plurality of base stations” and a “positioning means for determining the present position of the mobile station by using the GPS.” Ex-1006 ¶36. Nohara explains that “a mobile station, such as a cellular phone and a navigation system, is equipped with a GPS (Global Positioning System) receiving unit so that the GPS can be used to detect the present position of the mobile station.” *Id.* ¶294. As shown in Figure 22,

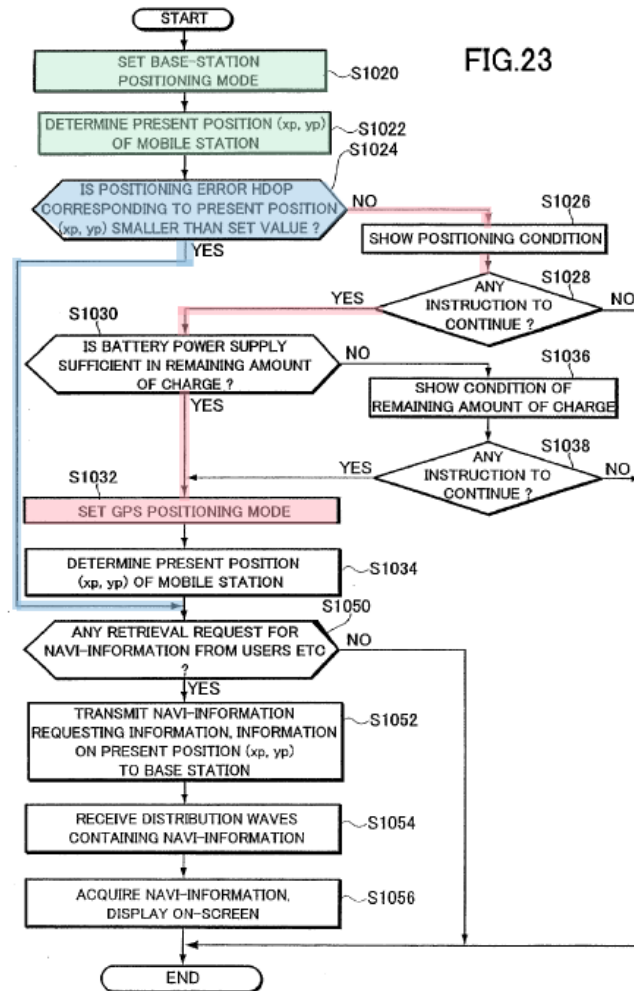
Nohara discloses position apparatus 10 which includes GPS unit 36 (purple)
cellular “transmitting/receiving unit” 11 (red). *Id.* ¶¶296-297.



Id., Fig. 22.

Also shown in Figure 22, Nohara’s “transmitting/receiving unit” 11 (red) has an antenna (“ANT”) separate from the GPS unit 36, for receiving base station radio waves. Ex-1006 ¶297. Separate from GPS positioning, Nohara teaches determining the present position “by using radio waves coming from the mobile station to a plurality of base stations [and a] positioning means for determining the present position of the mobile station.” *Id.* ¶36. Nohara further suggests “switch[ing] to the positioning by the GPS positioning means in cases where the result of the positioning based on the communication waves among the base stations and the mobile station exceeds a predetermined positioning error.” *Id.*

As shown in Figure 23, a flowchart depicting how Figure 22's system can be used, Nohara teaches powering on the GPS at step 1032 (below, blue) when a “positioning error” for “base-station positioning mode” is determined to be too high at step 1024 (below, blue). Ex-1006, Fig. 23. The GPS is powered on when “battery power supply 37 [] outputs a predetermined supply voltage V_{cc} to operate the GPS receiving unit 36.” *Id.* ¶298, Fig. 22.



Id., Fig. 23.

Nohara explains that if the error is not too high at step 1024 and thus below a threshold, it proceeds to step 1050 as shown by the blue line in the Figure 23 flowchart and bypasses GPS power on at step 1032 (red). Ex-1006 ¶307. In this way, Nohara explains, its system provides a non-GPS “base-station positioning mode which is capable of positioning with lower power consumption. Therefore, it is possible to reduce the power consumption of the battery power supply 37 significantly.” *Id.* ¶325. As the red line indicates, GPS power on at step 1032 occurs when the error is not less than (i.e., is greater than) a “set value” at step 1024.

C. Lau (Ex-1007)

Lau, titled “Method and apparatus for intelligent acquisition of position information,” was filed on March 26, 2003, and issued as U.S. Patent No. 6,975,941, on December 13, 2005. Lau qualifies as prior art under at least pre-AIA 35 U.S.C. §102(e).⁶

Lau discloses “a location monitoring system 100” which “operates to monitor the location of mobile devices using a Global Positioning System (GPS).” Ex-1007, 4:41-44. Lau explains the ability to save power and battery life by “the reduction in use of the GPS receiver 204 [which] also operates to reduce the

⁶ Petitioner is unaware of any earlier priority date for the ’206 Patent. If it becomes necessary to rely on Lau’s provisional applications, however, Petitioner will respectfully request supplementing the record as required by *Dynamic Drinkware*.

demands on wireless network bandwidth in transmitting and managing such location information.” *Id.*, 6:23-26. Lau states that “the GPS receiver is returned to a low-power state so as to conserve power.” *Id.*, 7:46-47. For example, “the low-power state (or powered-down state) can be a sleep mode or it can be a disabled mode.” *Id.*, 7:47-49. Lau explains that the GPS receiver is powered-up when “the motion [information for the mobile device] is greater than a threshold amount.” *Id.*, 7:27-28, 7:36-40.

XII. DETAILED EXPLANATION OF THE UNPATENTABILITY GROUNDS

The ’206 Patent contains nine claims, of which 37, 40, and 43 are independent. Claims 37, 40, and 43 are substantially the same except for claiming formalities (Claim 37 is a method claim, Claim 40 is an apparatus claim, and Claim 43 is a computer readable media claim). Like claim elements are discussed together in the below element by-element analysis. *See* Ex-1020 (summary table). To the extent there are meaningful differences, such differences are individually identified and discussed. As explained below, the challenged claims are disclosed and/or taught by the prior art.

A. Ground 1: Claims 37-45 Are Obvious Over Watters

1. Independent Claims 37, 40, and 43

- a. 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:

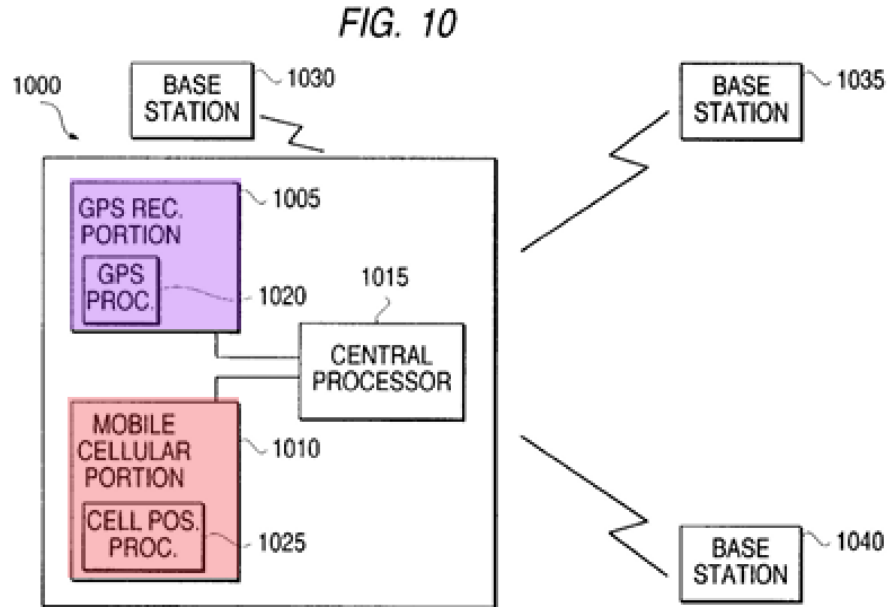
40[Pre]: A mobile wireless communication device for a wireless communications network, said mobile wireless communication device possessing wireless communications capability for said wireless communications network and an embedded GPS module for GPS capability, said GPS referring to GPS-based techniques, said mobile wireless communication device comprising:

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:

Watters teaches the preambles of Claims 37, 40, and 43, to the extent they are limiting. Ex-1002 ¶¶91-94.

As shown in Figure 10 (annotated), Watters discloses a mobile wireless communication device, mobile terminal 1000, which includes “GPS receiver

portion 1005 [annotated purple, below] [and] a mobile cellular portion 1010 [annotated red].” Ex-1005, 19:48-49.⁷



Id., Fig. 10.

Watters’s GPS Receiver portion 1005 is “an embedded GPS module for GPS capability, said GPS referring to GPS-based techniques” as claimed. Ex-1002 ¶93. As shown in Figure 10, Watters’s “GPS receiver portion 1005” is embedded in mobile terminal 1000. Ex-1005, Fig. 10. Further, “GPS receiver portion 1005” is a GPS module having GPS capability for calculating position. *Id.*, 19:54-56.

Watters also teaches a mobile wireless communication device that possesses wireless communications capability for said wireless communications network.

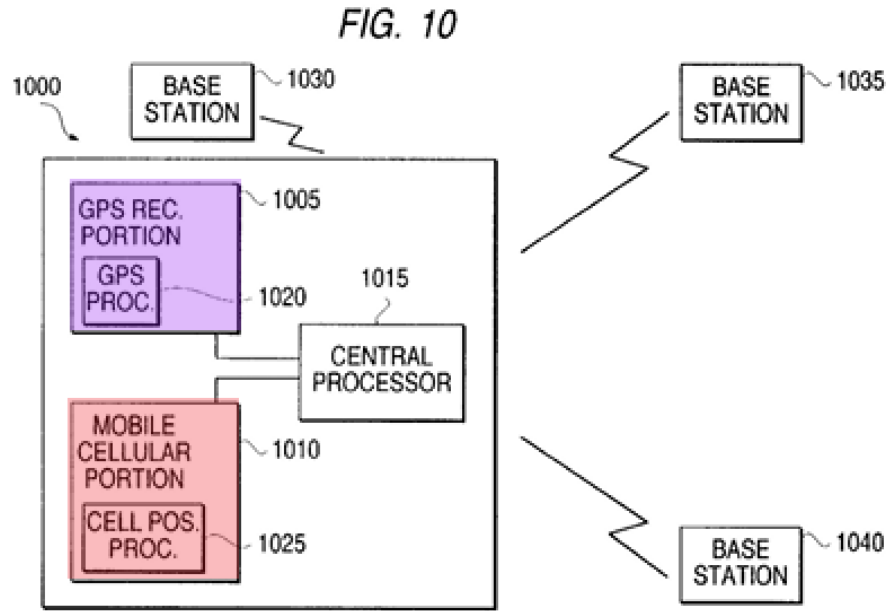
⁷ Throughout this Petition, all annotations and emphasis have been added, unless otherwise noted.

Ex-1002 ¶93. For example, Watters teaches that “mobile cellular portion 1010” (red, above) possesses wireless communications capabilities and “contains a cellular position processor [] that computes position using the cellular network infrastructure.” Ex-1005, 19:56-58.

- b. 40[A]: an embedded GPS module providing a GPS capability for said mobile wireless communication device;**
43[A]: a first portion designed to interface with the GPS capability of said mobile wireless communication device;

Watters teaches elements 40[A] and 43[A]. Ex-1002 ¶¶95-98.

As shown in Figure 10, Watters’s GPS module providing GPS capability includes element 1005, which is embedded in the mobile wireless communication device, mobile terminal 1000. Accordingly, Watters’s GPS capability is provided for the whole mobile wireless communication device 1000 that contains the GPS receiver portion 1005. Ex-1002 ¶96.



Id., Fig. 10.

A POSITA would have understood that Watters's central processor 1015 contains programming logic (a "first portion"⁸) to interface with the GPS capability in block 1005. Ex-1002 ¶97 (citing ¶¶64-69, which explains that a processor or central processor included programmable logic). For example, as discussed above in the description of Watters, Figure 12 is a flowchart depicting one approach to the operation of the mobile terminal in Figure 10. Ex-1005, 9:28-30. A POSITA would have recognized that the Figure 12 flowchart, which interfaces with both the GPS and the wireless communication network portions, 1005 and 1010, is an algorithmic representation of programming logic on central processor 1015 of

⁸ The term "portion" broadly refers to a portion of software or hardware (such as an ASIC or FPGA) that does what the claims require. Ex-1001, 4:4-26.

Figure 10. Ex-1002 ¶98 (citing Ex-1031, 0001-0002, explaining that flowcharts were used for describing algorithms, and that a CPU executes instructions of a computer program).

c. **37[A]: determining when said embedded GPS module should be powered on, said embedded GPS module then being powered on,**

40[B]: and means for determining when said embedded GPS module should be powered on, said embedded GPS module then being powered on

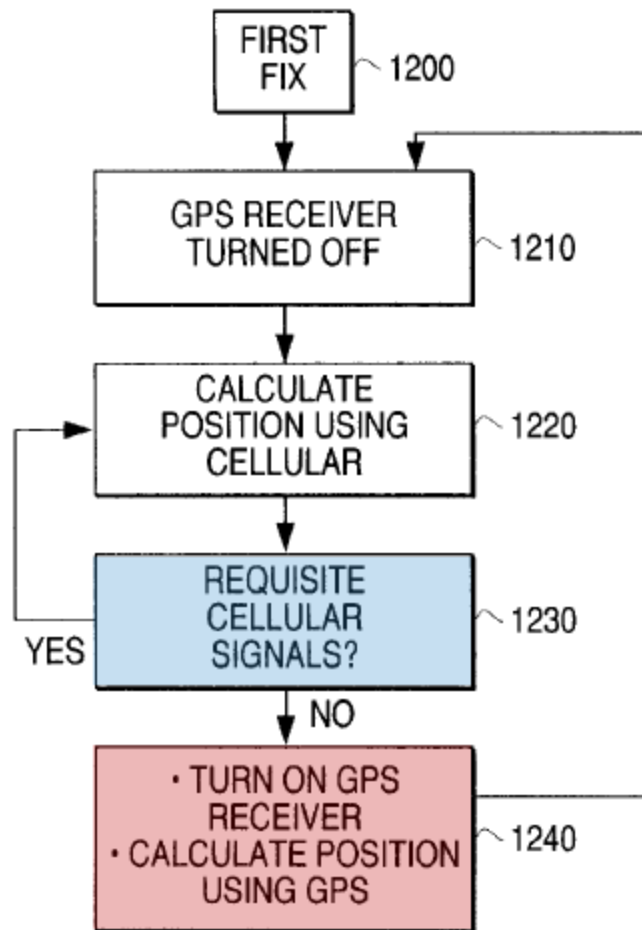
43[B]: and a second portion designed to determine when said embedded GPS module should be powered on, said embedded GPS module then being powered on,

Watters teaches elements 37[A], 40[B], and 43[B]. Ex-1002 ¶¶99-102.

Watters teaches determining when said embedded GPS module should be powered on and said embedded GPS module then being powered on. Specifically, as shown in Figure 12, Watters teaches that the GPS receiver should be powered on when the “cellular network infrastructure does not provide the necessary signals to determine position.” Ex-1005, 22:41-43. As shown below in step 1210, the GPS is in a “turned off” state. *Id.*, Fig. 12. Step 1220 calculates the position of the device using the cellular infrastructure, and step 1230 evaluates the quality of that position (i.e., the claimed “determining”). As shown, output from step 1230 (blue, below) is either a “yes” or a “no.” When the cellular position is not sufficient, e.g., because the required signals are not available (or, as explained below, of

inadequate quality), the output is “no” and the GPS receiver is “turned on” to determine position using GPS (below, red). *Id.*, 22:47-23:2; Ex-1002 ¶100 (citing ¶¶60-63 of the technical background discussion)

FIG. 12



Id., Fig. 12.

Claim 40[b] requires a “means for determining,” which should be construed as described above in Section X.A, and equivalents. Watters teaches at least the same equivalent structure and algorithm because it includes a mobile device, 1000,

with central processor, 1015, programmed to determine whether the position and position error are “too large,” (i.e., it exceeds one or more thresholds) as described further in Section XII.A.1.d, below. Watters also teaches the function of using this structure to determine when to switch from cellular-based positioning and power on GPS-based positioning using both a “current radio position” and a “position error” as discussed further in Section XII.A.1.d.

Finally, Claim 43 requires a “second portion”⁹ designed to determine when said embedded GPS module should be powered on.” As discussed above, a POSITA would have included programming logic (the second portion) to evaluate Figure 12, step 1230, at central processor 1015. Ex-1002 ¶102. Further, as discussed in Section XII.A.1.b, a POSITA would have understood that the first portion interfaces with the GPS capability in block 1005, while the different second portion at central processor 1015 evaluates Figure 12, step 1230 (which receives position information from the cellular system in step 1220). *Id.*

d. 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

⁹ The words “first” and “second” are known as “ordinal” terms in patent claim drafting. Indeed, a well-known convention in claim drafting is to use the term “first” to “distinguish between repeated instances of an element or limitation.” *3M Innovative Prop. Co. v. Avery Dennison Corp.*, 350 F.3d 1365, 1371 (Fed. Cir. 2003). Here, this means that the “first portion” and “second portion” simply refer to different portions of software or hardware (such as an ASIC or FPGA) that perform the different actions that the claims require of each recited “portion.”

mobile device determined from the wireless communications network, said wireless communications network being different from said GPS.

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.

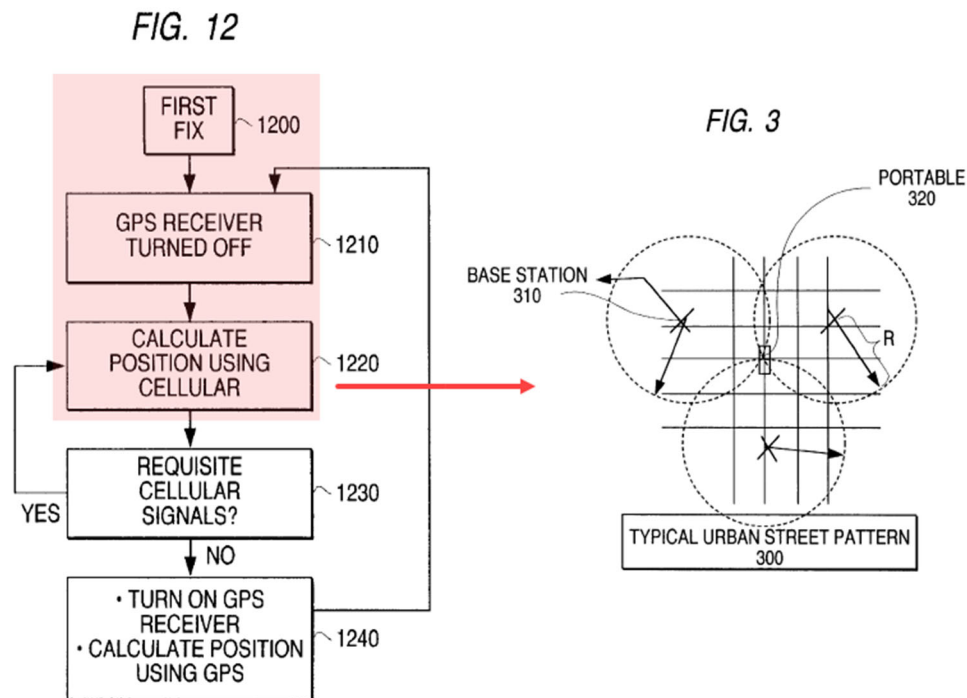
43[C]: said determining when said embedded GPS module should be powered on being dependent on at least one of a current radio position and a position error of said mobile device determined from the wireless communications network, said wireless communications network being different from said GPS.

Watters teaches elements 37[B], 40[C], and 43[C]. Ex-1002 ¶¶103-114.

Watters teaches the claims under the “conjunctive” interpretation discussed in Section X.B, above, because it teaches to use both a “current radio position” and a “position error” to determine when to switch from cellular based positioning and power on GPS-based positioning. Because Watters teaches the claims under the “conjunctive” interpretation, it also teaches the claims under the “disjunctive” interpretation as well for the reasons set forth below.

Regarding a “current radio position ... determined from the wireless communications network, said wireless communications network being different from said GPS,” Watters discloses a mobile terminal that “has the capabilities of

calculating its position ... using the cellular network infrastructure[.]” Ex-1005, 19:36-38. As shown in Figure 12, Watters teaches obtaining a “first fix” from GPS, then, with “GPS receiver turned off,” “calculat[ing] position using cellular.” *Id.*, Fig. 12 (below, red). Watters explains that algorithms based on “time of arrival” or “TOA” of cellular base station signals (shown in Figure 3, below right) can be used to obtain an “accurate location fix.” Ex-1005, 5:14-25; *see also id.*, 5:26-34 (explaining the time difference of arrival (TDOA) method). *See also e.g.*, Ex-1002 ¶105 (explaining that determining location using cellular infrastructure was a well-known technique different than using GPS techniques, and citing the technical background of his declaration, ¶¶53-59, and further discussing, e.g. Exs-1034, -1027, -1024, -1025)



Id., Fig. 3, Fig. 12. The Watters cellular position calculation at 1220 is, therefore, a “current radio position ... determined from the wireless communications network, said wireless communications network being different from said GPS.”¹⁰ Ex-1002 ¶106. After determining cellular position at step 1220, step 1230 determines whether that cellular position signal has the requisite accuracy for continued use. Ex-1002 ¶107. That is, step 1230 determines whether its “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,” as explained below.

First, 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.” Ex-1005, 22:59-60. A POSITA would have understood that

¹⁰ Indeed, during prosecution, applicant argued that non-GPS, wireless positioning was well-known in the art:

Applicant notes that determination of *a position using wireless networks alone (i.e., without GPS) is well known in the art* and the specification makes this clear (col. 1, lines 17-24). For example, determining a position alone using a wireless network forms part of E911 capabilities in the USA. This estimated position is not in general exactly the same as the actual location reported by a GPS due to noise in the wireless network signal. The amended independent claims make clear that we are referring to this wireless network position “*a position determined from the wireless communications network, said wireless communications network being different from said satellite positioning system.*”

Ex-1004, 0162.

determining “how far” a device has traveled requires knowing the starting position and the current position at the time the determination is made. Ex-1002 ¶108. The starting position is the position determined by GPS at the last update (step 1200), and the current position is the position determined by the cellular network at step 1220. Accordingly, determining “how far” the device has traveled is based on the current radio position of the device determined by the cellular network. Watters explains that GPS is used “[i]f a predetermined amount of time has passed, such as two minutes, *or the mobile terminal has moved a predetermined distance, such as 100 meters*[.]” Ex-1005, 22:61-63. Thus, Watters compares the current radio position determined from cellular sources using TOA or other non-GPS technique to the previous GPS fix and, if that distance exceeds a threshold (e.g., 100 meters), the GPS is turned back on to obtain a new fix. *Id.*, 22:63-64 (referring to Figure 12 (1240)). Under the “disjunctive” interpretation discussed in Section X.B, where either one of “position” or “position error” is sufficient to satisfy by the claims, the “position” determination discussed in this paragraph alone is sufficient to teach the claim limitation. Ex-1002 ¶108.

Second, Watters also teaches that the determination should also be based on a “position error.” Watters explains that there are errors inherent in cellular based approaches, such as TOA and TDOA, e.g. based on “multi-path errors.” Ex-1005,

5:54-6:12, 23:41-44.¹¹ Because there is some unreliability in cellular-based techniques based on the quality of the signal (e.g., multi-path signal propagation), Watters explains that the “rate at which GPS updates are needed [in block 1240] will depend on the conditions under which the mobile is operating.” *Id.*, 22:64-66. For example, Watters explains that the “100 meters” distance threshold described above should vary based on signal quality with “less frequent updates needed if ... cellular network infrastructure signals are known to be of good accuracy,” *id.*, 22:66-23:2, and, by contrast, more frequent updates if the signal accuracy is low, such as when multi-path propagation is present. *Id.*, 23:41-44 (GPS updates reduce errors from multi-path problems). A POSITA would have understood that a signal with “good accuracy” leads to low positioning errors, while a signal of “poor accuracy” leads to relatively larger positioning errors. Ex-1002 ¶111 (citing Ex-1030, and explaining that a weak signal may indicate a multipath propagation, which would result in higher positioning errors in a TOA calculation). Further, a

¹¹ Watters teaches that position errors may also arise in several other ways, such as errors inherent in range measurements, and clock/drift errors. *See, e.g.*, Ex-1005, 21:14-21 (“range measurements inherently contain an error”); 6:18-20 (“The error due to the drift grows larger the longer the mobile terminal clock is used.”). Watters system is designed such that it could use both spatial (e.g., 100 meters) and temporal (e.g., 2 minutes) thresholds as a mechanism to turn on/off GPS. In fact, a POSITA would have understood to use both of the thresholds concurrently for maximum system responsiveness. Ex-1002, fn. 20. Additionally, a POSITA would have understood that a signal may not be sufficiently “available” for use even if it was received, when errors in the signal are too high. Ex-1002, fn. 21.

POSITA would have understood that “more frequent updates” thus should be implemented when signals were of lower accuracy (leading to larger positioning errors). *Id.* For example, a positional error caused by multi-path propagation, poor base-station geometry, or other signal quality issues may be compared to a threshold to adjust the timing of the next power up (that is to make it “more frequent”). Ex-1002 ¶¶112-113 (citing ¶¶60-63, explaining that multi-path affects TDOA positioning, further citing Ex-1024, 3:51-56; Ex-1025, Abstract.).

Accordingly, a POSITA would have recognized Watters as teaching “when said embedded GPS module should be powered on dependent on at least one of a current radio position and a position error of said mobile device.” Ex-1002 ¶111 (citing Ex-1030, Fig. 1, explaining that accuracy of this method depends on the range or conditions under which the mobile device is operating). In Watters, these determinations are based on comparisons to both a position and position error threshold. Specifically, Watters includes comparisons to a 100 meter positional threshold, which threshold may be adjusted to account for position errors by requiring more or less frequent updates depending on whether the signals have “good accuracy.”

Regarding Claim 40’s “means” term, Watters discloses the recited algorithm because the processor in the mobile device determines that the current radio position has exceeded a threshold and/or position error exceeds an error threshold

such that may not be of sufficiently “good accuracy” (i.e., position error is “too high”). Specifically, the system may determine that the distance traveled (i.e., the current radio position) exceeds a positional threshold (e.g., 100 meters), which threshold may itself be adjusted to account for position error by requiring more or less frequent updates. Ex-1002 ¶114.

2. Dependent Claims 38, 41, 44

- a. Claim 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.**

Claim 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.

Claim 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.

Watters teaches Claims 38, 41, and 44. Ex-1002 ¶¶115-121.

Watters teaches powering up the GPS receiver from a low-power mode (such as a TricklePower power-down mode, which, the patent describes as prior art, Ex-1001, 2:37-51).¹² Watters explains that when the GPS receiver is first

¹² The term “such as” is a commonly used term to define an example, rather than a specific limit to a claim. *See, e.g., Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 811 (Fed. Cir. 2002) (“The district court correctly found that the term ‘such as’ means ‘of a kind or character about to be indicated, suggested, or exemplified; for instance.’”) Moreover, a POSITA would have understood the

turned on from a fully powered down state, the GPS receiver calculates its initial position, which is “known as a ‘first fix’ on location.” Ex-1005, 2:40-41. The “time-to-first-fix” (TTFF) “represents the time required for a receiver to acquire the satellite signals and navigation data, and to calculate its initial position.” *Id.*, 2:51-53. Watters explains that “[i]f the receiver has no estimate of current time and position and a recent copy of almanac data, then this process generally takes about 12.5 minutes.” *Id.*, 2:39-59. In order to avoid delays from a long “cold-start” TTFF,¹³ a POSITA would have been motivated to maintain the GPS receiver in a low power state mode. This low-power stand-by mode would allow the GPS to start up faster by maintaining ephemeris and almanac data in memory, thereby avoiding a cold start and enabling the device to obtain its position fix more quickly. Ex-1002 ¶¶117-118.

term “TricklePower” as a brand or trade name associated with Laipac Technology, Inc., which was known at the time. Ex-1001, 2:42-46, Cover. Accordingly, at least because this patent was not associated with Laipac or its brands, a POSITA would have understood that the claims would cover GPS modes of a kind that support low power modes, of which “TricklePower” is simply a known example in the prior art. Ex-1002 ¶116 (citing ¶¶50-52, which provide an overview of well-known low power states used with GPS systems and provides examples such as, Ex-1023, Ex-1026, Ex-1028, Ex-1029 (discussing a lower power “tricklestate”)), Ex-1033.

¹³ The ’206 Patent discusses the need to “speed[] up the GPS acquisition of a mobile device relative to the acquisition from a cold start,” which a POSITA would understand to be is describing the same TTFF delays discussed in Watters. Ex-1001, 2:23-24; Ex-1002 ¶121.

Indeed, a POSITA would recognize this feature as taught by Claim 6 of Watters. Watters teaches that the GPS receiver may be only “*substantially* turned off” when a requisite number of cellular signals are being received. Ex-1005, Cl. 6; Ex-1002 ¶¶119-120. A POSITA would have understood that the GPS system may be “substantially [but not completely] turned off” by maintaining a low, keep-alive power to the device. Then, when the GPS system was needed it would be fully powered up from a low-power or idle mode. Ex-1002 ¶119 (citing ¶¶50-52, and further discussing Ex-1028, 3:31-37, which explains that a GPS may be only substantially turned off to conserve power). A POSITA would have recognized that such a substantially turned off, lower power state is far less taxing on battery power, because maintaining ephemeris and almanac data in memory uses less power. *Id.* A POSITA would have understood that such a low power mode would maintain the necessary GPS state data to avoid TTFF delays resulting from a fully-powered-down cold start where all data must be reacquired from scratch. Ex-1002 ¶¶118-119 (citing Ex-1023; Ex-1026, 3:52-54; Ex-1028, 3:31-37 explaining that fully turning off the GPS receiver causes problems).

- b. Claim 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.**

Claim 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.

Claim 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.

Watters teaches Claims 39, 42, and 45. Ex-1002 ¶¶122-125.

Watters teaches determining the last location determined by GPS and determining position relative to base stations of the cellular network. Ex-1002 ¶123. Further, a POSITA would have understood that the last GPS-determined position would be a position compared to the cellular position, for determining whether the “100 meter” movement threshold discussed in Section XII.A.1.d was exceeded, and that the determination of when to power up the GPS function thus depends, at least in part, on the last GPS-determined position. *Id.* (citing ¶¶50-52, Ex-1028, 3:31-37, explaining that the GPS receiver holds in memory ranging information and position calculations). Specifically, as discussed in Section XII.1.A.d, Watters teaches determining “how far (in space) the mobile terminal has moved *since the last GPS update*.” Ex-1005, 22:59-60. This is all the claim requires, but it bears pointing out 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. Ex-1002 ¶124.

Furthermore, although also unnecessary to the claims in view of the foregoing teachings of Watters, Watters also teaches determining when the GPS receiver should be powered on dependent on a last time determined by the GPS. Watters explains that the GPS is used “[i]f a predetermined amount of time has passed, such as two minutes ... ” Ex-1005, 22:61-63. Thus, in order to determine that a predetermined amount of time has passed, a POSITA would have understood that the system would have also determined the GPS time when the last GPS signal was received, and compared that to the current known time. *Id.*, 22:63-64 (referring to Figure 12 (1230)). Accordingly, a POSITA would have been motivated to use either or both of the positional and temporal thresholds concurrently for maximum system responsiveness. Ex-1002 ¶125 (citing ¶¶50-52, describing known power conservation approaches, and further discussing Ex-1028, 3:31-37; Ex-1026, 3:52-54, 18:19-19:19 explaining how either or both of the 100 meter and two minute thresholds would have been applied).

B. Ground 2: Claims 37, 40, and 43 Are Obvious Over Nohara (Ex-1006)

1. Independent Claims 37, 40, and 43

- a. 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:

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:

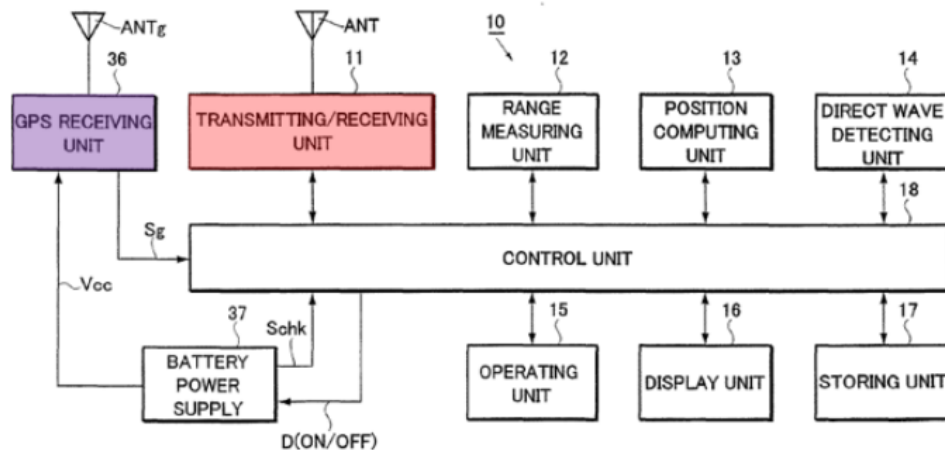
43[Pre]: A computer program product for a mobile wireless communication device for a wireless communication network, said mobile wireless communication device possessing wireless communications capability for said wireless communications network and an embedded GPS module for GPS capability, said GPS 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:

Nohara teaches the preambles of Claims 37, 40, and 43, to the extent they are limiting. Ex-1002 ¶¶126-129.

Nohara teaches the use of “an embedded GPS module for GPS capability, said GPS referring to GPS-based techniques.” Ex-1002 ¶127. Specifically, Nohara teaches both a “system for determining the present position of a mobile station by using radio waves coming from the mobile station to a plurality of base stations”

and a “positioning means for determining the present position of the mobile station by using the GPS.” Ex-1006 ¶36. For example, as shown in Figure 22 below, Nohara discloses a mobile wireless communication device, mobile station 10, which includes GPS receiving unit 36 (purple) and transmitting/receiving unit 11 (red). *Id.* ¶¶296, 297, Fig. 22. Nohara teaches that GPS receiving unit 36 is a GPS module for GPS capability that “can be used to detect the present position of the mobile station” and is embedded in mobile station 10. *Id.* ¶294.

FIG.22



Specifically, GPS receiving unit 36 is for “generating a GPS signal Sg from the radio waves received at the receiving antenna ANTg.” Ex-1006 ¶296. The “incoming waves from the GPS satellites are received, and the present position (xp, yp) of the positioning apparatus 10 is determined based on the GPS signal Sg output from the GPS receiving unit 36.” *Id.* ¶315.

Nohara also teaches that the mobile wireless communication device (i.e., mobile station 10) possesses wireless communications capability for said wireless communications network. For example, Nohara discloses “a transmitting/receiving antenna ANT and transmitting/receiving unit 11 for conducting communications with base stations.” Ex-1006 ¶297.

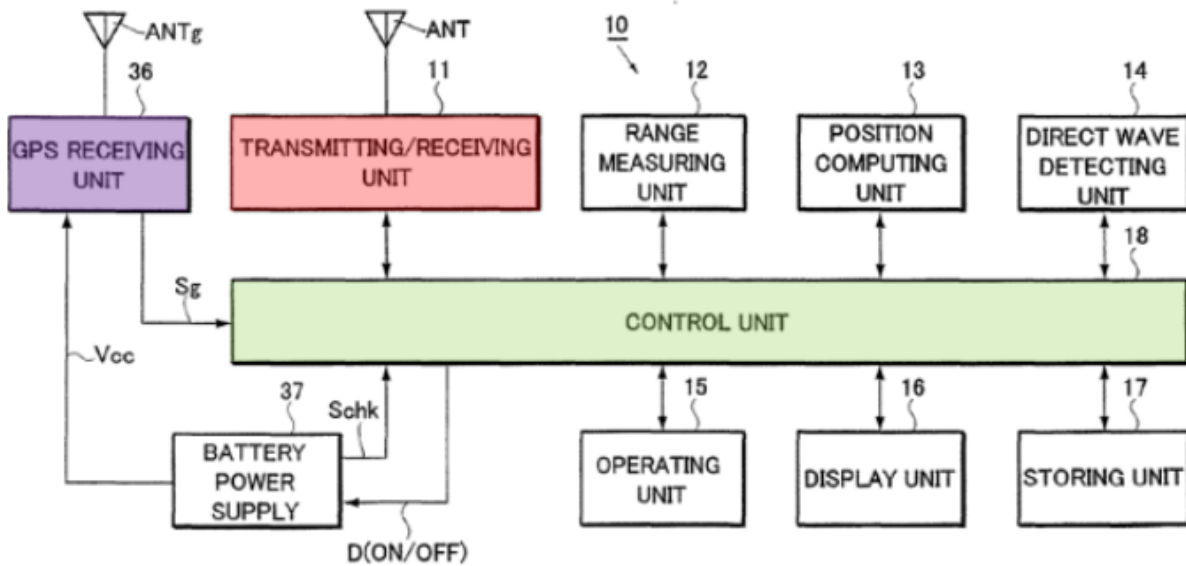
b. 40[A]: an embedded GPS module providing a GPS capability for said mobile wireless communication device;

43[A]: a first portion designed to interface with the GPS capability of said mobile wireless communication device;

Nohara teaches elements 40[A] and 43[A]. Ex-1002 ¶¶130-132.

Nohara’s GPS module providing GPS capability includes GPS receiving unit 36 (purple) that is part of mobile station 10 in Figure 22. GPS receiving unit 36 is thus an embedded GPS that provides GPS capability for the entire mobile station 10 in which it is embedded.

FIG.22



Ex-1006, Fig. 10.

A POSITA would have understood that Nohara's control unit 18 contains programming logic (a "first portion") to interface with the GPS capability of GPS receiving unit 36. Ex-1002 ¶132. For example, Nohara teaches that control unit 18 (green, above) is capable of "exercising central control over the entire mobile station 10," which includes GPS receiving unit 36. Ex-1006 ¶297. Nohara further teaches that mobile station elements 12, 13, and 14, "have the function of determining the present position (x_p,y_p) of the positioning apparatus 10 based on the GPS signal S_g supplied from the GPS receiving unit 36 through control unit 18." *Id.* ¶300. A POSITA would have recognized that the Figure 23 example, which similarly interfaces with both GPS and the wireless communication network

portions, 36 and 11, would have been implemented using programming logic on control unit 18. Ex-1002 ¶132 (citing Ex, 1031, 0002 and Ex-1032 explaining that flowcharts are used for describing algorithms and main processors executes instructions of computer programs).

c. **37[A]: determining when said embedded GPS module should be powered on, said embedded GPS module then being powered on,**

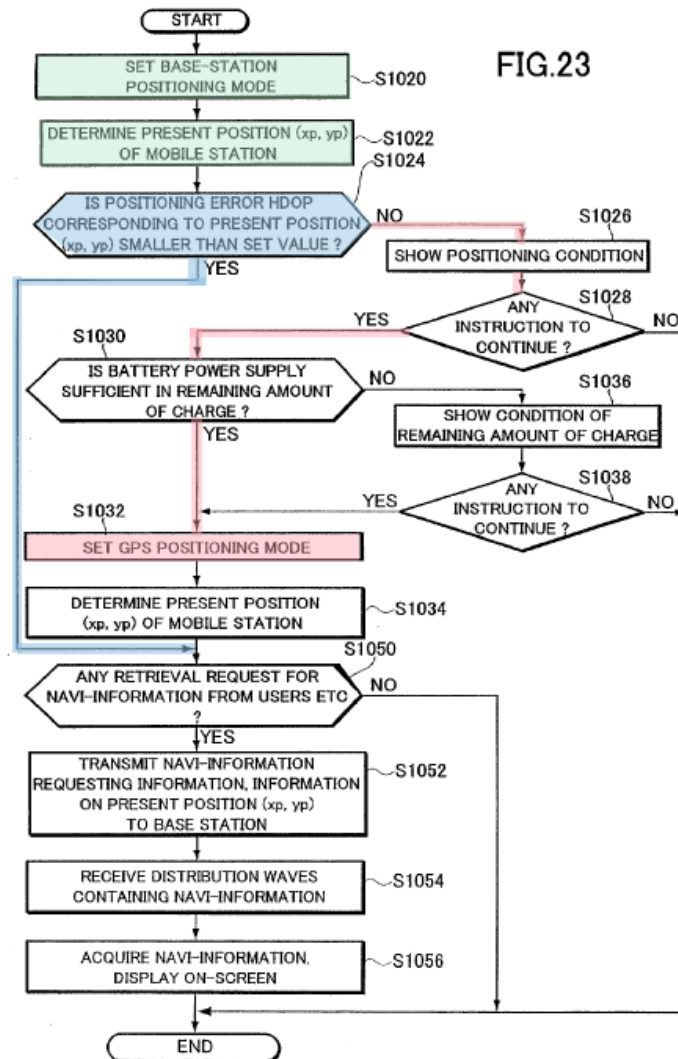
40[B]: and means for determining when said embedded GPS module should be powered on, said embedded GPS module then being powered on

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,

Nohara teaches elements 37[A], 40[B], and 43[B]. Ex-1002 ¶¶133-137.

Nohara teaches determining when said embedded GPS module should be powered on and said embedded GPS module then being powered on. Specifically, Nohara teaches powering on GPS when a calculated Horizontal Dilution of Precision (HDOP) value (also called a “positioning error”), Ex-1006 ¶¶144, 147, for “base-station positioning mode” is too high (i.e., is not “smaller than set value”). *Id.*, Fig 23 (Steps 1024). Nohara’s use of “positioning error HDOP” is discussed further below in Section XII.B.1.d (explaining that if the current position error determined from the wireless communications network is below a certain threshold, the power of the GPS receiver is not turned on). As shown in Figure 23

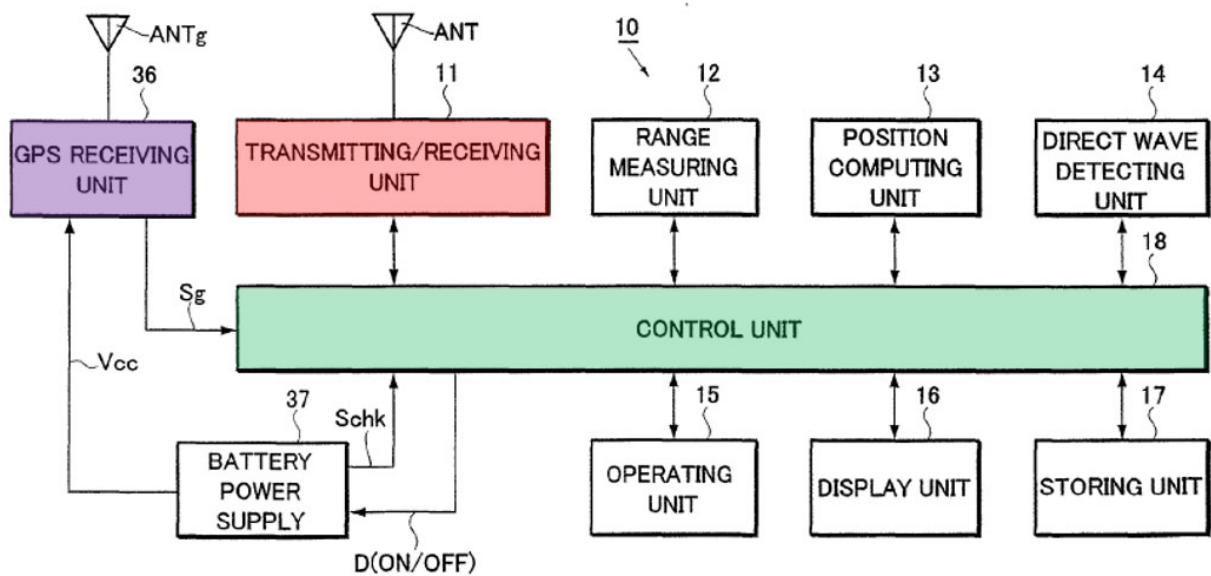
below, at steps 1020 and 1022 (green, below), a current radio position is calculated using a “base-station positioning mode.” Step 1024 (blue, below), determines whether HDOP is smaller than a certain set value. If the answer is “no” (i.e., HDOP is larger than the set value), then the algorithm proceeds through steps 1026, 1028, and 1030, ultimately ending at step 1032, “set GPS Positioning mode” (red line). Ex-1002 ¶134.



Id., Fig. 23.

At step 1032, the GPS is powered on. Nohara teaches that “when the GPS positioning mode is set at step S1032 [above, red] control unit 18 ... instructs that the supply voltage V_{cc} of the battery power supply 37 be supplied to the GPS receiving unit 36,” Ex-1006 ¶315 as shown in Figure 22 below. Because the battery power supply is being supplied to the GPS at step 1032, the GPS will be powered on. Ex-1002 ¶135.

FIG.22



Claim 40 requires a “means for determining” that should be construed as described above in Section X.A, and equivalents. Nohara teaches at least the equivalent structure and algorithm because it includes control unit 18 (green, above) that is capable of “exercising central control over the entire mobile station 10.” Ex-1002 ¶136. Nohara also teaches performance of the function and explains

that this control determines when the HDOP error exceeds a threshold (i.e., is not “smaller than set value”), at step 1024 in Figure 23 (above, blue), and then instructs the battery to supply power to the GPS to turn it on when necessary, through the red path to step 1032 (above Fig. 23, red), corresponding to the claimed algorithm described in Section X.A. Ex-1006 ¶297.

Finally, Claim 43 requires a “second portion designed to determine when said embedded GPS module should be powered on.” As discussed above, a POSITA would have included programming logic (the claimed “second portion”) to evaluate Figure 23, step 1024, at control unit 18. Ex-1002 ¶137. Thus, as discussed in Section XII.B.1.b, a POSITA would have understood that the first portion interfaces with the GPS capability of GPS receiving unit and the second portion at control unit 18 evaluates at step 1024 in Figure 23 (which receives position information from the cellular system in step 1022). *Id.*

d. 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.

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.

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.

Nohara teaches elements 37[B], 40[C], and 43[C]. Ex-1002 ¶¶138-147.

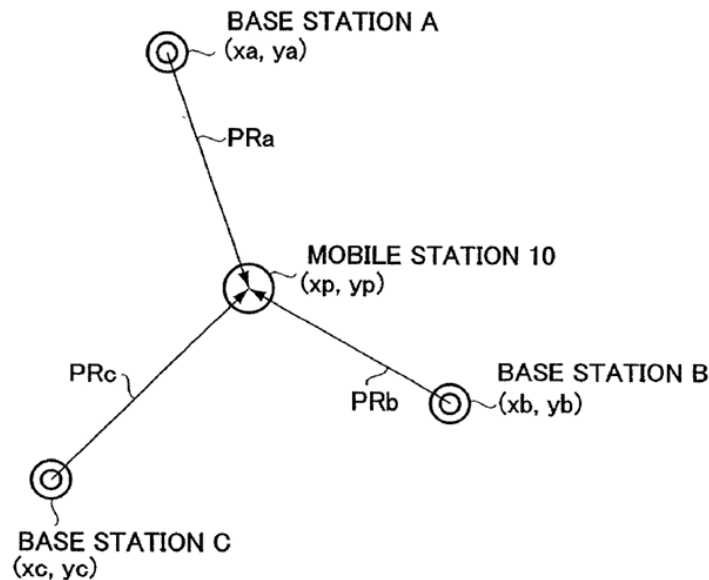
Nohara teaches the claims under the “disjunctive” interpretation discussed in Section X.B, above, because it uses a “position error” to determine when to switch from cellular based positioning and power on GPS-based positioning.¹⁴ Ex-1002 ¶139.

As discussed above in Section XII.B.1.c, Nohara teaches that the determination of turning on the GPS receiver of the mobile device is based on a “position error” or “HDOP,” determined from the wireless communications network. Specifically, Nohara discloses a mobile device that has the capability to “determine the present position (xp,yp) of the positioning apparatus 10 based on the radio waves coming from the base stations A, B, and C.” Ex-1006 ¶300. Nohara explains that at the start position, “GPS receiving unit 36 is not supplied with the supply voltage Vcc for activation.” *Id.* ¶303. A POSITA would have

¹⁴ The “conjunctive” interpretation is discussed in Ground 4, applying Watters’s and Nohara’s teachings in combination.

understood that the GPS is powered off when it is not supplied with a power supply voltage. Ex-1002 ¶140. Nohara teaches that the first step is the “base-station positioning mode,” where “control unit 18 sets a positioning mode of using incoming waves from base stations for positioning.” Ex-1006 ¶304. Nohara teaches that at this first step, “present position(x_p , y_p) of the positioning apparatus 10” is determined using “pseudo ranges of the incoming waves and the positions (x_a , y_a), (x_b , y_b), and (x_c , y_c) of the respective base stations A, B, and C.” *Id.* ¶306. This cellular-based positioning technique is shown in Figure 6. As depicted, the signals are from the wireless communication network base stations, which are different than GPS (which is initially powered down).

FIG.6



Id., Fig. 6.

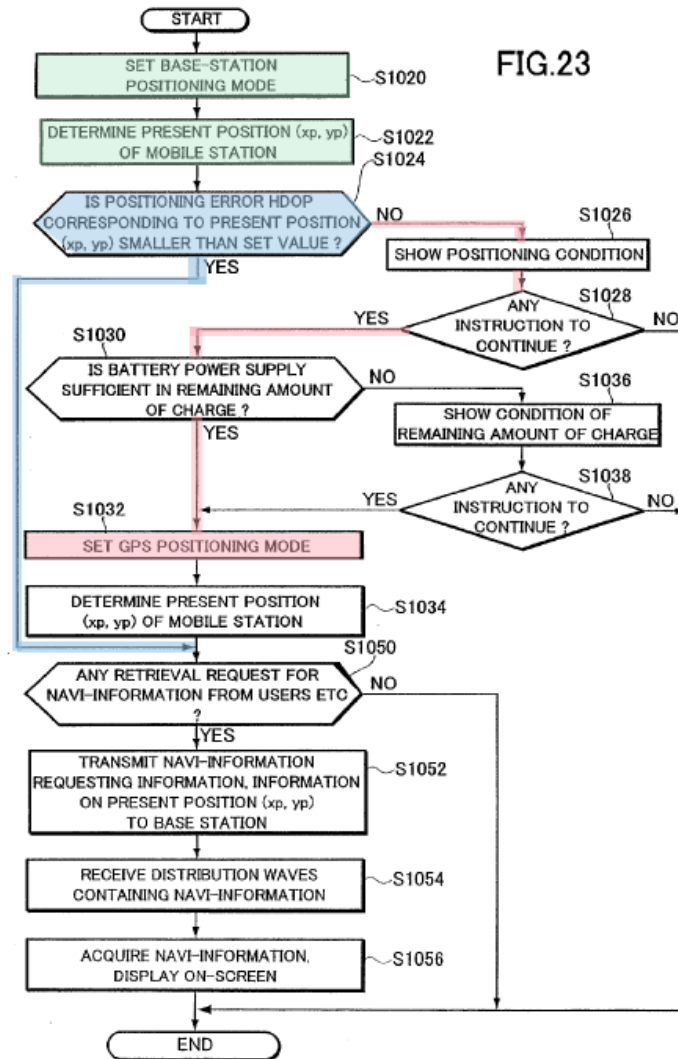
Nohara further teaches a mathematical expression used to quantify position errors associated with this cellular positioning technique. Ex-1002 ¶141.

Specifically “as shown in the following equation (11), a root-sum-square value HDOP (Horizontal Dilution of Precision) of the terms σ_{xx}^2 and σ_{yy}^2 is determined. The value HDOP shall be regarded as the positioning error quantified on the plane in the horizon system of coordinates.” Ex-1006 ¶144.

$$HDOP = \sqrt{\sigma_{xx}^2 + \sigma_{yy}^2} \quad (11)$$

As described in Figure 23, in one scenario, Nohara teaches that in the next step, “S1024, it is determined if the positioning error HDOP obtained upon the determination of the present position (xp, yp) of the positioning apparatus 10 is smaller than a predetermined set value.” Ex-1006 ¶307. In this step, Nohara teaches that “[i]f the positioning error HDOP is smaller than the set value (if ‘YES’), the present position (xp,yp) is decided to have high positioning precision, and the positioning operation in the base-station positioning mode is ended.” *Id.* Therefore, Nohara teaches that if the current position error determined from the wireless communications network is below a certain threshold (“set value”), the GPS receiver is not powered on. In this scenario, as shown below in Figure 23, the process bypasses step 1032 (red) that would have turned on the GPS (blue arrow).

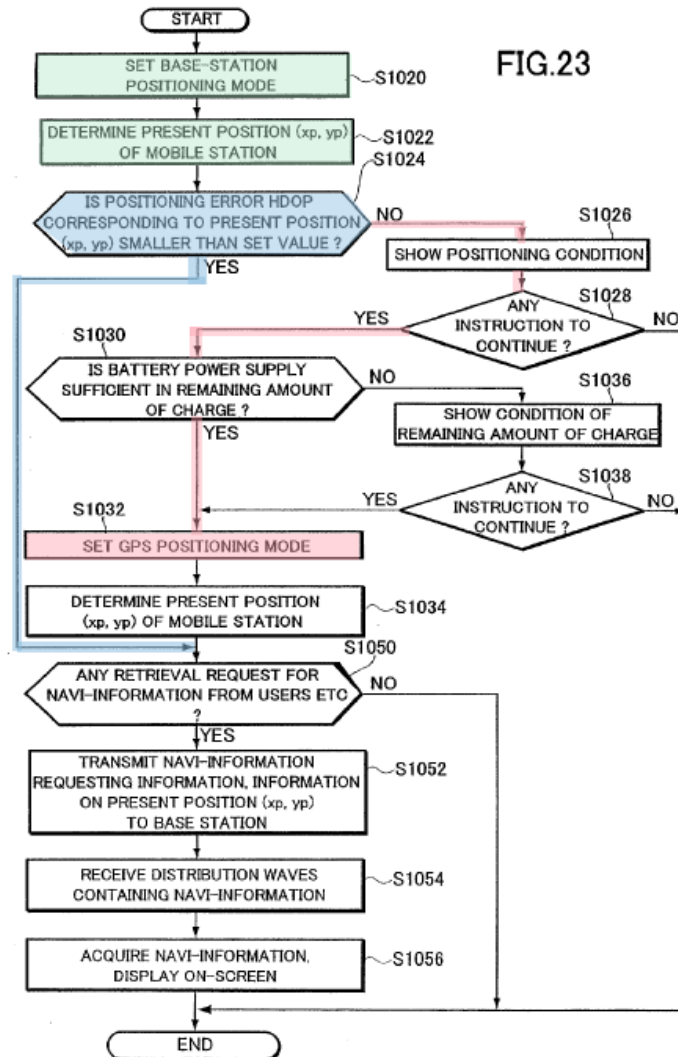
Ex-1002 ¶142 (citing ¶¶50-52, describing known GPS turn-off approaches, and further discussing Ex-1026, 3:52-54, 18:19-19:19, in which GPS is turned off when positioning information is not required).



Id., Fig. 23.

In another scenario, Nohara teaches that “[a]t step S1024 above, if the positioning error HDOP corresponding to the present position (xp,yp) determined in the base-station positioning mode is greater than the predetermined set value (if

‘NO’), go to step S1026. Here, . . . favorable positioning precision has not been obtained . . .” Ex-1006 ¶310. In this step, Nohara further teaches that “an instruction to continue the positioning operations is given, . . . go to step S1030” at step 1028 (*id.* ¶311), and then a battery check for the remaining amount of charge is determined at step 1030 (*id.* ¶312). Once these steps are completed, Nohara teaches that, “[i]f the remaining amount of charge is sufficient (if ‘YES’), [it] enter[s] step S1032 [GPS positioning mode,] to set a positioning mode of using the GPS for positioning.” *Id.* Nohara also teaches that while in the GPS positioning mode, “control unit 18 supplies the battery power supply . . . to the GPS receiving unit 36.” *Id.* ¶315. Therefore, Nohara teaches that if the current position error, HDOP, is too high, then the GPS module is powered on (at step 1032). This depends on whether the position error determined from the wireless communications network is above a certain threshold (step 1024). Ex-1002 ¶143.



Id., Fig. 23.

This is based at least on a “position error” as claimed because whether the step that turns on the GPS is specifically executed depends on whether the “position error HDOP” threshold is exceeded. Ex-1002 ¶¶144-145. GPS is turned on when this occurs.

Regarding Claim 40’s “means” term, Nohara discloses the recited algorithm because control unit 18 in the mobile positioning apparatus determines when the

position error (HDOP) is above a predetermined threshold. Ex-1002 ¶¶146-147.

Specifically, Nohara discloses that “it is determined” whether the HDOP error associated with the present position is “greater than a predetermined set value,” and therefore, the turning on the power of Nohara’s GPS receiver (*see id.* ¶310) is dependent on, and occurs when, the position error is greater than a threshold.

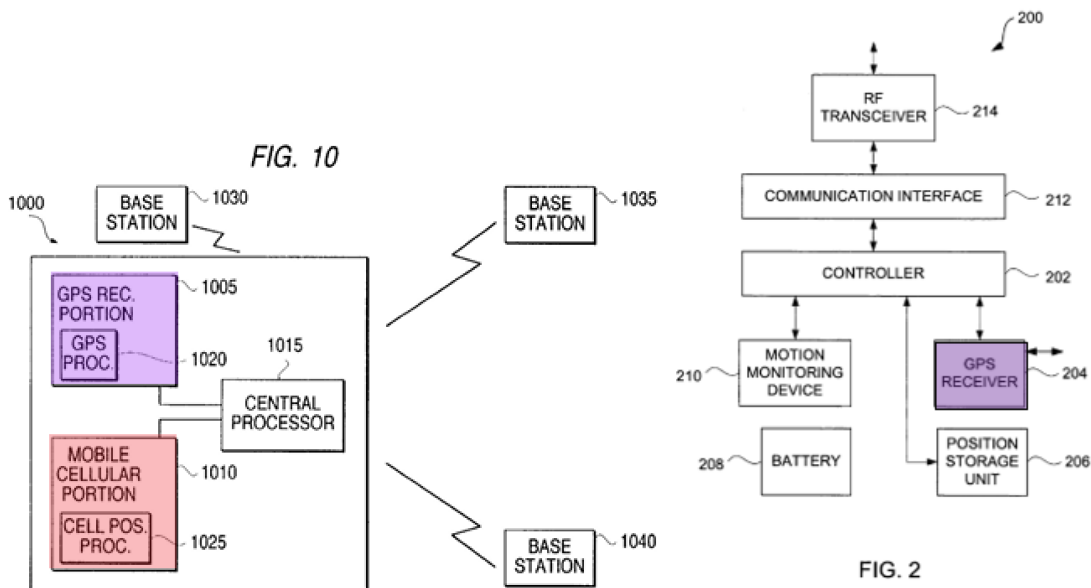
C. Ground 3: Claims 38, 41, and 44 Are Obvious Over Watters in View of Lau (Ex-1007)

1. A POSITA would have been motivated to combine the teachings of Watters and Lau, and would have had a reasonable expectation of doing so

A POSITA would have been motivated to combine the teachings of Watters and Lau. Both references relate to global positioning satellite systems and address the need to optimize battery life. Ex-1005, 1:6-10; Ex-1007, 4:40-46; Ex-1002 ¶¶148-149. Watters discloses a GPS receiver that calculates position and a mobile cellular portion that computes position using a cellular network. Ex-1005, 19:54-58, 20:8-12 (using TDOA). Watters explains that in order to reduce power consumption, “it may be desirable to rely on the cellular network infrastructure to calculate position.” *Id.*, 22:38-40. Similarly, Lau discloses a location monitoring system, which monitors the location of mobile devices using a GPS. Ex-1007, 4:41-44. Lau teaches the ability to save power and battery life by reducing the use of the GPS, which also reduces “the demands on wireless network bandwidth in transmitting and managing such location information.” *Id.*, 6:19-26. Lau also

expressly teaches the use of low GPS power states such as sleep or hibernate. *Id.*, 9:65-10:2. Lau teaches “low power maintenance of the GPS receiver allow[s] the mobile device to significantly reduce its power consumption while still providing constant location monitoring.” *Id.*, 8:66-9:2. A POSITA would have been motivated to apply the teachings of both Watters and Lau and reduce power consumption by allowing the GPS to remain in a no-power or low-power mode to conserve power, because this was a common goal of both systems. Ex-1002 ¶148.

Specifically, in the Watters-Lau combination, a POSITA would have recognized the benefit of using Lau’s teachings regarding GPS receiver 204 maintaining a “low power state,” such as sleep mode in the comparable Watters GPS receiver 1005, which may be “substantially” turned off. Ex-1002 ¶149 (citing ¶¶50-52, discussing known low-power GPS states, and further explaining Ex-1023; Ex-1026, 3:52-54, 18:19-19:19, which include such states.) A POSITA would have done so to enable Watters’s GPS receiver 1005 to use recent GPS state data such as almanac and ephemeris data that would have been reasonably fresh, thereby avoiding a cold start when, for example, Watters attempts to turn on the GPS every 2 minutes. Ex-1002 ¶149 (citing ¶¶50-52, explaining that a GPS will hold prior position data, and explaining Ex-1028, 3:31-37 as further support). Each of these GPS receivers were routine at the time, and implementing power saving teachings on either of them would have been routine design choices. *Id.*



2. Dependent Claims 38, 41, 44

Watters in view of Lau teaches Claims 38, 41, and 44. Ex-1002 ¶¶150-153.

As discussed in Section XII.A.2.a, Watters teaches powering up the GPS receiver from a low-power (“substantially” turned off) mode. Ex-1002 ¶151 (citing ¶¶50-52, and explaining, e.g., Ex-1029 ¶15 (“tricklestate” mode)). To the extent that a POSITA would have desired additional implementation details for low-power GPS modes, a POSITA would have turned to an additional reference, such as Lau, which teaches routine details such as a low-power sleep mode. *Id.* (citing Ex-1028, 3:31-37; Ex-1029 ¶15; Ex-1033 ¶10 explaining placing the GPS in a low-power state mode to conserve power is common).

For example, Lau teaches that after its GPS receiver obtains the GPS position of the mobile device, the “GPS receiver is returned to a low-power state so

as to conserve power.” Ex-1007, 7:40-44, 7:46-47. Lau explains that “the low-power state (or powered-down state) can be a sleep mode or it can be a disabled mode.” *Id.*, 7:47-49, 9:65-10:2 (“powered-off, disabled, sleep, hibernate, or other low power mode”); Ex-1002 ¶152 (citing Ex-1023; Ex-1026, 3:52-54, 18:19-19:19 explaining that maintaining GPS data avoids the long “cold start” process).

A POSITA would have been motivated to implement these teachings in Watters, as explained in Section XII.C.1. Ex-1002 ¶153. Specifically, Watters’s Claim 6 states that the GPS should be “substantially” turned off when a requisite number of cellular signals are being received. Ex-1005, Cl. 6. A POSITA would have applied the specific teachings of Lau such that when the GPS was “substantially” turned off as taught in Watters’s Claim 6, the GPS would be “returned to a low-power state so as to conserve power” rather than being fully turned off, as taught by Lau. Ex-1002 ¶153 (citing ¶¶50-52, explaining that fully turning off the GPS receiver would not have been viable, further citing Ex-1023; Ex-1026, 3:52-54, 18:19-19:19 as support). Examples of low power states would include sleep, whereby GPS variables are maintained in memory under minimal power.¹⁵ *Id.* Accordingly, when the GPS was powered up after having previously

¹⁵ As with familiar battery powered notebook and tablet computers, sleep generally refers to maintaining state information in volatile memory (e.g., RAM), where a small amount of power is drawn to keep the memory state refreshed, but which can be quickly accessed when “awakened.” Ex-1002, fn. 22 (citing ¶¶50-52, discussion Ex-1033, 0010-0011).

been placed in such a low-power mode, it would be “powering up from a low-power mode” as claimed. This would have conserved power and also allowed the GPS to maintain its ephemeris and almanac data and avoid a lengthy cold-start requiring a long TTFF, as explained in Section XII.A.2.a.

D. Ground 4: Claims 37-45 Are Obvious Over Watters and Nohara

1. A POSITA would have been motivated to combine the teachings of Watters and Nohara, and would have had a reasonable expectation of doing so

Watters and Nohara teach all of the limitations of Claims 37-45. Ex-1002 ¶154. Nohara, similar to Watters, relates to global positioning satellite systems and addresses the need to optimize battery life. Ex-1006 ¶38. Watters and Nohara also both address the need to resolve multi-path errors, which could lead to the deterioration of the positioning accuracy. Ex-1005, 5:65-6:1; Ex-1006 ¶14. Nohara teaches a “system for determining the present position of a mobile station by using radio waves coming from the mobile station to a plurality of base stations” and a “positioning means for determining the present position of the mobile station by using the GPS.” Ex-1006 ¶36. Nohara also explicitly discloses determining Horizontal Dilution of Precision (HDOP), which is a well-known quantification of errors caused by multi-path and geometric effects, among others. *Id.* ¶307; Ex-1002 ¶154. Thus, a POSITA would have been motivated to combine the teachings of Watters and Nohara’s express teaching to use HDOP calculations as a routine

approach for quantifying the “inherent errors” that Watters acknowledges. Ex-1002 ¶154 (citing ¶¶60-63, and explaining that HDOP provides an estimate of error).

These implementation details from Nohara would have been applied in Watters for determining whether to power on the GPS and determine a more accurate position of the mobile device to address multi-path and geometry induced position errors.

Id. This was a common goal of both Watters’s and Nohara’s systems. *Id.*

Specifically, Watters teaches that multi-path errors result from changes in the transmission path of the signal that the mobile terminal receives from the base station. Ex-1005, 5:65-6:1. In the combination, Nohara’s teaching regarding powering on the GPS when a calculated Horizontal Dilution of Precision (HDOP) value (also called a “positioning error”) for “base-station positioning mode” is too high would have been implemented with Watters’s base stations calculations to address these same problems. Ex-1002 ¶155 (citing ¶¶60-63, explaining that each of these systems address problems of multi-path errors).

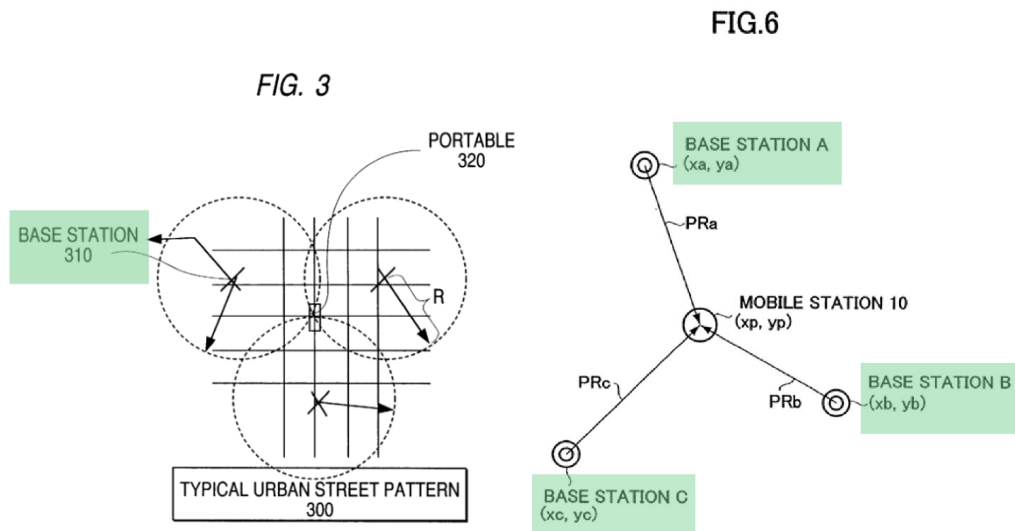
Nohara explains that HDOP is a mathematical quantification of “position error.” Nohara explains that HDOP is used as a quantitative measure of whether there is too much error in the signal to reliably use that signal. Ex-1006 ¶144. If there is too much error, then Nohara teaches to use GPS. *Id.*, Fig. 23. Watters teaches to use a positional threshold, e.g., traveling more than 100 meters from the last GPS fix, to decide whether to turn the GPS back on. Watters continues and

teaches that these GPS updates also may be more or less frequent, depending on whether the cellular signal received is of “good accuracy.” Ex-1005, 22:61-66. Watters leaves implementation details to a POSITA on the best way to determine whether a signal is of sufficiently “good accuracy” (which details would have been obvious, as explained in Section XII.A.1.c and XII.A.1.d). To the extent further teachings would have been desired, Nohara expressly teaches an objective measure that a POSITA would have known to use to quantify how good the position error is (HDOP). Ex-1002 ¶156.

A POSITA would have been motivated to implement Nohara’s quantitative “position error” measure in Watters because it would allow a POSITA to place a concrete number on how “good” the “accuracy” is. Ex-1002 ¶157. Moreover, Nohara’s HDOP algorithm and evaluation would have been implemented in Watters Figure 12, at step 1230, which determines whether or not the “requisite cellular signals” are accurate enough. In the Watters-Nohara combination if, for example, the HDOP value is consistently too high, the system would know that cell reception is not of “good accuracy” and the GPS updates will have to be more frequent. A POSITA would have understood how to implement Watters’s and Nohara together, and would have been motivated to apply each reference to overcome shortcomings of the other. Ex-1002 ¶¶157-160 (explaining specifically how the Watters-Nohara thresholds would have been applied, shortcomings of

Watters that would have been address by Nohara, and shortcomings of Nohara that would have been addressed by Watters.)

Each of these systems describe, acknowledge, and address problems of, e.g., multi-path errors in routine and complimentary ways. And implementing these teachings on either of them would have involved routine and familiar design choices to overcome multi-path deficiencies that each recognize as associated with the use of the cellular-positioning technology. Ex-1002 ¶161.



2. Independent Claims 37, 40, and 43

In the Watters-Nohara combination, Watters discloses and teaches all elements of the claims as discussed in Ground 1. However, to the extent it is found that Watters does not sufficiently teach claim elements, 37[B], 40[C] and 43[C], and assuming the conjunctive interpretation of the claims, those elements are taught by the combination of Watters and Nohara, as explained below in Section

XII.D.2.d, below. In Watters-Nohara, the Watters's system is implemented in combination with the HDOP position error determination of Nohara. Additionally, to the extent that Patent Owner argues that Watters as discussed in Ground 1 above does not teach any other specific claim element, any such claim element would have been taught in the combination by Nohara, as explained in the cross references to Ground 2 in Sections XII.D.2.a, .b, and .c, below.

a. 37[Pre], 40[Pre], 43[Pre]:

Watters-Nohara teaches the preambles of Claims 37, 40, and 43, to the extent they are limiting. Ex-1002 ¶¶162-163.

As discussed in Sections XII.A.1.a and XII.B.1.a, each of Watters and Nohara teach “an embedded GPS module for GPS capability, said GPS referring to GPS-based techniques” and a mobile wireless communication device that possesses wireless communications capability for said wireless communications network. These systems are routine and complimentary, and a POSITA would have had a reasonable expectation of success in incorporating the comparable teachings from Nohara into the system of Watters. Ex-1002 ¶163.

b. 40[A], 43[A]:

Watters-Nohara teaches elements 40[A] and 43[A], as discussed with respect to elements 40[A] and 43[A] in Section XII.A.1.b and Section XII.B.1.b. Ex-1002 ¶¶164-165.

As discussed in Section XII.A.1.b, Watters teaches a central processor that contains programming logic (a “first portion”) to interface with GPS capability. Further, as discussed in Section XII.B.1.b, Nohara teaches a control unit which contains a programming logic (a “first portion”) to interface with the GPS capability of the GPS receiving unit. These systems are routine and complimentary, and a POSITA would have had a reasonable expectation of success in incorporating the comparable teachings from Nohara into the system of Watters. Ex-1002 ¶165.

c. 37[A], 40[B], 43[B]:

Watters-Nohara teaches elements 37[A], 40[B], and 43[B]. Ex-1002 ¶¶166-167.

As discussed in Section XII.A.1.c, and Section XII.B.1.c each of Watters and Nohara teach “determining when said embedded GPS module should be powered on and said embedded GPS module then being powered on,” “means for determining when said embedded GPS module should be powered on,” and “a second portion designed to determine when said embedded GPS module should be powered on.” These systems are routine and complimentary, and a POSITA would have had a reasonable expectation of success in incorporating the comparable teachings from Nohara into the system of Watters. Ex-1002 ¶167. Additionally, see Section XII.D.2.d, below, discussing the structure and recited function of using “at

least one of a current radio position and a position error of said mobile device determined from the wireless communications network. *See also* Ex-1002 ¶¶169-173

d. 37[B], 40[C], 43[C]:

Watters-Nohara teaches elements 37[B], 40[C], and 43[C]. Ex-1002 ¶¶168-169.

Watters-Nohara teaches the claims under the “conjunctive” interpretation discussed in Section X.B, above, because the combination teaches to use both a “current radio position” and a “position error” to determine when to switch from cellular based positioning and power on GPS-based positioning. Additionally, because Watters and Nohara teaches the claims under the “conjunctive” interpretation, the combination also teaches the claims under the “disjunctive” interpretation as well for the reasons set forth below.

As discussed in Section XII.A.1.d, Watters teaches to use both a “current radio position” and a “position error” to determine when to switch from cellular based positioning and power on GPS-based positioning. For example, at block 1230, Watters determines if there are enough cellular signals available for “calculating position[ing] (e.g., three signals in the TDOA).” Ex-1005, 22:50-54. *See also e.g.*, Ex-1002 ¶105 (Mr. Andrews explaining that determination location using cellular infrastructure is a well-known technique different than using GPS

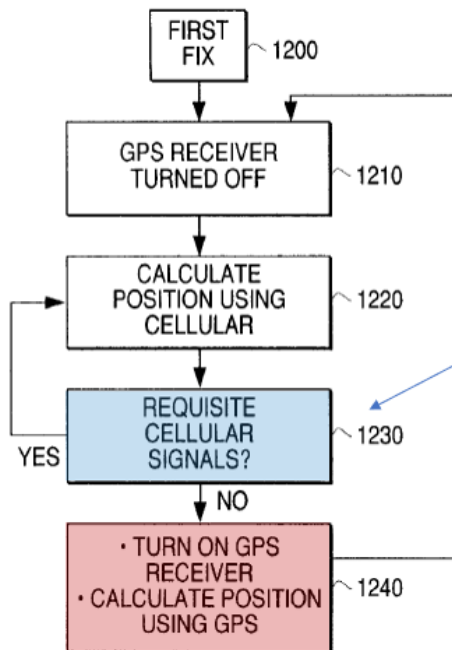
techniques, and citing the technical background of his declaration, Section IX.E, ¶¶53-59, and further discussing, e.g. Exs-1034, -1027, -1024, -1025). Watters also explains that if the mobile terminal's position has moved more than 100 meters, than a GPS update would be called for and the process proceeds to block 1240. *Id.*, 22:62-65. Watters suggests that additional functionality (e.g., additional “inquiries”) can also be included in step 1230. *Id.*, 22:57-62 (“Alternative inquiries at block 1230 include 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.”); Ex-1002 ¶173 (explaining that implementing these additional inquiries together in step 1230 would have been a routine design choice to improve upon the teachings of both Watters and Nohara).

Watters explains, however, that because there is unreliability in cellular-based techniques based on the quality of the signal, the “rate at which GPS updates are needed [in block 1240] will depend on conditions under which the mobile is operating.” Ex-1005, 22:64-66. For example, Watters teaches that the exemplary “100 meter” predetermined distance should vary based on signal quality, with “less frequent updates needed if ... cellular network infrastructure signals are known to be of good accuracy,” and, by contrast, more frequent updates needed if the signal quality is low, *id.*, 22:61-66, such as when multi-path propagation is present. *Id.*, 23:41-44 (GPS updates reduce the effects of multi-path errors). *See also e.g.*, Ex-

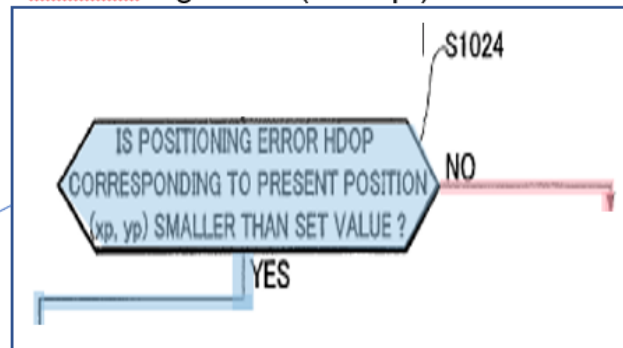
1002 ¶¶170-172 (explaining that Watters’ teachings would have motivated a POSITA to quantify errors as accurately as possible, to ensure the best operation of Watters’s algorithm to save power); ¶¶60-63 (explaining how positioning errors arise and are addressed in conventional systems).

Thus, to the extent that a POSITA would have desired additional implementation details for determining or quantifying position errors at block 1230, a POSITA would have turned to an additional reference, such as Nohara, which specifically provides such details. Ex-1002 ¶170 (citing ¶¶60-63).

FIG. 12



Nohara Figure 23 (excerpt)



As discussed in Section XII.B.1.c-d, Nohara teaches that the determination of the turning on the GPS receiver of the mobile device is based on a “position error,” or “HDOP,” determined from the wireless communications network. At

block 1230 of Watters, a POSITA would have been motivated to implement Nohara's technique of quantifying "position error HDOP" with Watters's use of error (or accuracy)-based thresholds (as related to time or distance since previous GPS fix) in determining when to power on GPS. *See*, Section XII.D.1. This would have allowed for Watters's system to more precisely quantify "inherent errors" caused by, e.g., multi-path propagation. Because both Watters and Nohara recognize potential error sources such as multi-path errors, a POSITA would have understood that Nohara's technique would have been applicable to solve the same problems identified by Watters, which uses errors to determine when to turn on GPS, as explained in Section XII.A.1.d. *See also* Ex-1002 ¶¶170-173 (providing additional explanations of motivations and expectation of success on implementation).

A POSITA would have implemented Nohara's position error (HDOP) determination as a routine design choice for one of the additional "inquiries" contemplated in Watters step 1230. Ex-1002 ¶¶172-173. In the combined Watters-Nohara implementation, the evaluation of whether the distance threshold has been reached would depend on the current radio position (Watters's current radio position used to evaluate whether the distance threshold is crossed), and position error (Nohara's HDOP) to determine when the update threshold should be altered (thus making GPS updates more or less frequent). Specifically, Nohara's HDOP

calculation would have been implemented in Watter's step 1230, which determines whether the "requisite" signal is sufficient for positioning purposes. And when the answer is "no" (e.g., because an HDOP value is too high and accuracy is too low) then threshold is lowered, and GPS will be used at Watters's step 1240 when that lowered threshold is crossed. Ex-1002 ¶172. For example, a POSITA would have set a smaller distance update threshold to update when the device moves, e.g., 80 meters instead of 100 meters. If at that time the device had already moved 90 meters from the position of the last fix, then the system would immediately turn on GPS, since the modified threshold has already been exceeded. But if the device had only moved 60 meters, for example, then the GPS would not turn on again until when the modified 80 meter threshold is exceeded at a later time, which would occur sooner than if the threshold had not been modified. Ex-1002 ¶157.

3. Dependent Claims 38, 41, 44

a. Claims 38, 41, 44:

Watters and Nohara teach Claims 38, 41, and 44. Ex-1002 ¶¶174-175.

As discussed in Section XII.A.2.a Watters teaches powering up the GPS receiver from a low-power mode such as a TricklePower power-down mode, e.g., as exemplified by its Claim 6. Watters and Nohara's GPS systems are each routine and complimentary, and a POSITA would have had a reasonable expectation of success in incorporating the comparable teachings from Watters and Nohara,

including for the reasons discussed in Sections XII.D.1 and XII.A.2.a. Ex-1002

¶175.

b. Claims 39, 42, 45:

Watters and Nohara teach Claims 39, 42, and 45. Ex-1002 ¶¶176-177.

As discussed in Section XII.A.2.b Watters teaches determining when the GPS receiver should be powered on “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.” As explained in connection with Watters, a POSITA would have been motivated to also include both spatial and temporal measures in using this determination. Ex-1005, 22:61-63. These systems are each routine and complimentary, and a POSITA would have had a reasonable expectation of success in incorporating the comparable teachings from Nohara into the system of Watters. Ex-1002 ¶177.

E. Ground 5: Claims 38, 41, and 44 Are Obvious Over Watters and Nohara in further view of Lau

1. A POSITA would have been motivated to combine the teachings of Watters, Nohara, and Lau, and would have had a reasonable expectation of doing so

Watters and Nohara teach all the limitations of Claims 37-45, as explained above in Sections, XII.A, .B and .D. And they would have been combined as explained in Section XII.D.1. Watters and Lau teach all of the limitations of Claims 38, 41, and 44, as explained above in Sections XII.A.2.a and .C. And they

would have been combined for the reasons explained in Section XII.C.1. Still further, each of Watters, Nohara, and Lau relate to systems and methods of turning on and off GPS in ways that balance power consumption with positional accuracy. In the combination, and to address these particular claims, no specific teaching of Nohara is necessary, since the applicable teachings are found in Watters and Lau. Ex-1002 ¶178.

a. Claims 38, 41, and 44:

Watters and Nohara in view of Lau teaches Claims 38, 41, and 44. Ex-1002 ¶¶179-180.

As discussed in Section XII.A.2.a Watters teaches powering up the GPS receiver from a low-power mode such as a TricklePower power-down mode e.g., as exemplified by its Claim 6. Further, as discussed in Section XII.C.2.a, Lau's GPS receiver is returned to a low-power state, such as sleep, so as to conserve power. Further, as discussed in Section XII.B, Nohara implements routine GPS systems applied for their routine purposes of providing GPS position information. These systems are each routine and complimentary, and a POSITA would have had a reasonable expectation of success in incorporating the comparable teachings from Lau with Watters and Nohara. Ex-1002 ¶180.

XIII. THE BOARD SHOULD NOT USE ITS DISCRETION TO DENY INSTITUTION UNDER *FINTIV*

The Board should decline any request by Patent Owner to exercise discretion to deny institution under 35 U.S.C. § 314(a). While Director Vidal’s June 21, 2022 Guidance made clear that “Fintiv is limited to facts of that case,” for completeness, Petitioner addresses the factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential). As explained below, the six factors set out in *Fintiv* do not justify denying institution.

As an initial matter, there is no litigation currently pending against Co-petitioner Google. Accordingly, none of the *Fintiv* factors that depend on actions or activities of a petitioner in a co-pending litigation apply in any respect to Google. When each of these factors is weighed against Co-petitioner Google, they strongly weigh against denial. Accordingly, the Board should decline to exercise its discretion under 35 U.S.C. § 314(a).

The **first *Fintiv* factor** applied against co-petitioner Samsung alone is neutral here because Samsung has not yet moved to stay the district court proceedings pending IPR, and the PTAB will not infer how the district court would rule should a stay be requested. *See, e.g., Hulu LLC v. SITO Mobile R&D IP, LLC et al.*, IPR2021-00298, Paper 11 at 10-11 (PTAB May 19, 2021).

For the **second *Fintiv* factor** applied against co-petitioner Samsung alone, the district court has set a trial date of November 18, 2024, approximately 13.5

months in the future. Even assuming that this date set more than a year in the future holds, its timing does not tip in favor of denying the petition in this case. *See, e.g., Apple Inc. v. Koss Corp.*, IPR2021-00305, Paper 14 at 13 (PTAB June 3, 2021). This Petition is filed in October 2023. An institution decision should be issued within about six months, around April 2024. And a final written decision (FWD) should be issued in April 2025. Thus, the earliest estimated trial date is about 5 months before the FWD. PTAB cases analyzing similar schedules have weighed the second factor as neutral or, at most, slightly in favor of denial. *See, e.g., Micron Techn., Inc., v. Vervain LLC*, IPR2021-01150, Paper 11 at 10 (PTAB, Apr. 11, 2022) (trial scheduled for three months before FWD only “slightly favors” exercising discretion); *STMicroelectronics, Inc., v. Optical Licensing, LLC*, IPR2021-01593, Paper 9 at 12 (PTAB, Mar. 17, 2022) (trial scheduled approximately two months before FWD “is neutral as to whether to exercise our discretion”).

The **third *Fintiv* factor** applied against co-petitioner Samsung alone, weighs strongly against denial. There has been very little activity in the case. The *Markman* hearing is set for May 2024, after the deadline to institute this proceeding. There have been no substantive fact depositions (other than depositions related to venue), no claim construction disclosures, no expert discovery, and no case activity other than a Motion to Dismiss (MTD) and venue

motions. Samsung has filed a motion to transfer, which will further pause any substantive case activity if granted. Because the investment in the parallel court proceeding has been minimal, and because what activity has occurred is related to venue and other MTD issues rather than the substantive prior art invalidity issues, and because Petitioner acted diligently by filing this IPR petition within about 3 months of Co-Petitioner Samsung receiving Patent Owner's infringement contentions, this factor weighs strongly against discretionary denial. *See, e.g., Sand Revolution II, LLC v. Cont'l Intermodal Grp.-Trucking LLC*, IPR2019-01393, Paper 24 at 10 (PTAB, June 16, 2020) (informative) (“[M]uch of the district court’s investment relates to ancillary matters untethered to the validity issue itself.”); *Samsung Elecs. Co., LTD., v. Mypaq Holdings LTD.*, IPR2022-00308, Paper 11 at 11 (PTAB, May 23, 2022) (a motion to transfer venues is “ancillary discovery matters” and “does not show substantial district court investment in the validity issues”).

The **fourth *Fintiv* factor** applied against co-petitioner Samsung alone, also weighs against denial. As noted above, the case is in an early stage and there has been very little activity in the case. At present, there is little overlap in issues between the litigation and any IPR resulting from this petition. It would be premature to conclude that the issues raised in this proceeding will overlap with those in the District Court. Instituting this proceeding will allow the Board to

address the asserted prior art, narrowing the issues in the co-pending litigations due to the estoppel provisions of 35 U.S.C. §315(e)(2).

Moreover, as noted above, Co-Petitioner Google is not a party to the co-pending litigation. This IPR is thus the only forum in which Google can present its invalidity challenge.

On the **fifth *Fintiv* factor**, the Board should give little weight to the fact that Co-Petitioner Samsung and Patent Owner are the same parties as in district court. *See Weatherford U.S., L.P., v. Enventure Global Tech., Inc.*, Paper 16 at 11-13 (Apr. 14, 2021). Although Samsung is both petitioner and litigation defendant, this factor does not outweigh the other factors that strongly weigh against discretionary denial. Moreover, the fact that Co-Petitioner Google is *not* a party to the litigation strongly weighs against.

This petition presents “compelling merits” under the **sixth *Fintiv* factor**, which further weigh against discretionary denial. Where the Board “determines that the information presented at the institution stage presents a compelling unpatentability challenge, that determination alone demonstrates that the PTAB should not discretionarily deny institution under *Fintiv*.” USPTO Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (June 21, 2022). The merits of the Petition are especially compelling here because Watters and Nohara present strong single

reference obviousness cases, with each expressly teaching the exact limitation that the examiner stated was missing from the applied prior art in its Notice of Allowance. *Compare* Ex-1004, 0371 (Notice of allowance issued because prior art did not disclose non-GPS-based positioning) *with* Section XII.A.1.d (Watters teaching cellular based positioning); Section XII.B.1.d (Nohara teaching cellular based positioning).

Taken together holistically, especially given that one of the petitioners is not a litigant in the pending district action, the *Fintiv/NHK* factors strongly weigh against denial.

XIV. CONCLUSION

The unpatentability grounds presented above are reasonably likely to prevail, *inter partes* review should be instituted, and Claims 37-45 should be cancelled as unpatentable over the prior art.

Respectfully Submitted,

/s/ Ben Haber
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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner certifies that this petition includes 13,820 words, as measured by Microsoft Word, exclusive of the table of contents, mandatory notices under § 42.8, certificates of service, word count, and exhibits.

CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e)(1))

The undersigned hereby certifies that the above document was served on October 3, 2023, by filing this document through the Patent Trial and Appeal Board P-TACTS System, as well as delivering a copy via express mail upon the following attorneys of record for the Patent Owner and Petitioner:

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