

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: *Alles et al.*

U.S. Patent No.: 8,406,753

Attorney Docket No.: 50095-0140IP1

Issue Date: March 26, 2013

Appl. Serial No.: 12/026,480

Filing Date: February 5, 2008

Title: SYSTEM AND METHOD FOR GENERATING A LOCATION
ESTIMATE USING UNIFORM AND NON-UNIFORM GRID
POINTS

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**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 8,406,753 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

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EXHIBITS

EX1001	U.S. Patent No. 8,406,753 to Alles et al. (“the ’753 Patent”)
EX1002	Excerpts from the Prosecution History of the ’753 Patent (“the Prosecution History”)
EX1003	Declaration of Dr. Karthikeyan Sundaresan
EX1004	U.S. Application Publ. No. 2006/0211376 to Tarun Kumar Bhattacharya <i>et al.</i> (“Bhattacharya”)
EX1005	[RESERVED]
EX1006	U.S. Patent No. 7,783,299 to Robert J. Anderson <i>et al.</i> (“Anderson”)
EX1007	Special Mobile Group (SMG) Technical Committee (TC), European Telecommunications Standards Institute, <i>GSM Technical Specification - Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification (GSM 04.08)</i> (Dec. 1995)
EX1008	U.S. Patent No. 6,560,442 to George Yost <i>et al.</i> (“Yost”)
EX1009-EX1019	[RESERVED]
EX1020	Memorandum Opinion & Order (Docket No. 92), <i>Geoscope Technologies PTE. LTD. v Apple Inc.</i> , 1:22-cv-01373, (E.D. Va. Jul. 19, 2023)
EX1021	[RESERVED]
EX1022	Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (USPTO Jun. 21, 2022) (“Interim Procedure”)

- EX1023 Memorandum Opinion (Docket No. 109), *Geoscope Technologies PTE. LTD. v Apple Inc.*, 1:22-cv-01373, (E.D. Va. Sep. 18, 2023)
- EX1024 Notice of Appeal dated Sept. 25, 2023, *Geoscope Technologies PTE. LTD. v Apple Inc.*, 1:22-cv-01373, (E.D. VA.)
- EX1025 Stipulation Regarding Agreed Upon Claim Constructions (Docket No. 70), *Geoscope Technologies PTE. LTD. v Apple Inc.*, 1:22-cv-01373, (E.D. Va. May 23, 2023)

LIST OF CHALLENGED CLAIMS

Limitation	Claim Language
[1pre]	A method of determining the location of a mobile device in a geographic region comprising the steps of:
[1a]	(a) providing calibration data for each of one or more calibration points in a geographic region, said calibration data having one or more characterizing parameters;
[1b]	(b) generating one or more sets of grid points for said calibration data;
[1c]	(c) receiving at least one network measurement report from a mobile device at an unknown location in said geographic region;
[1d]	(d) evaluating said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing parameters;
[1e]	(e) selecting a set of grid points as a function of a predetermined criteria; and
[1f]	(f) determining the location of a mobile device in said geographic region as a function of said selected set of grid points.
[7]	The method of claim 1 wherein said calibration data comprises information from a network measurement report.
[9]	The method of claim 1 wherein said characterizing parameter is selected from the group consisting of: signal strength for a signal transmitted by a transmitter having a known location as received by a receiver at said grid point; signal strength of a signal transmitted by a transmitter located at said grid point as received by a receiver at a known location; round trip time for a signal traveling between said grid point and a known location; timing advance of a signal received by said mobile device at said grid point; time difference of arrival of plural signals at said grid point with respect to a pair of known locations as measured by a receiver at said grid point or at said known locations; the identification of a serving cell or serving sector of said mobile device located at said grid point; a state of a wireless network serving said mobile device, and combinations thereof.

Limitation	Claim Language
[32pre]	A system for determining the location of a mobile device in a geographic region comprising:
[32a]	(a) a database; and
[32b]	(b) a processor for receiving calibration data for each of one or more calibration points in a geographic region . . . , said calibration data and network measurement report having at least one characterizing parameter
[32c]	(b) a processor for . . . receiving at least one network measurement report from a mobile device at an unknown location in said geographic region
[32d]	said processor is programmed to: (i) generate one or more sets of grid points for said calibration data,
[32e]	said processor is programmed to: . . . (ii) evaluate said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing parameters,
[32f]	said processor is programmed to: . . . (iii) select a set of grid points as a function of a predetermined criteria, and
[32g]	said processor is programmed to: . . . (iv) determine the location of a mobile device in said geographic region as a function of said selected set.
[38]	The system of claim 32 wherein said calibration data comprises information from a network measurement report.

Limitation	Claim Language
[40]	The system of claim 32 wherein said characterizing parameter is selected from the group consisting of: signal strength for a signal transmitted by a transmitter having a known location as received by a receiver at said grid point; signal strength of a signal transmitted by a transmitter located at said grid point as received by a receiver at a known location; round trip time for a signal traveling between said grid point and a known location; timing advance of a signal received by said mobile device at said grid point; time difference of arrival of plural signals at said grid point with respect to a pair of known locations as measured by a receiver at said grid point or at said known locations; the identification of a serving cell or serving sector of said mobile device located at said grid point; a state of a wireless network serving said mobile device, and combinations thereof.

Apple Inc. (“Petitioner” or “Apple”) petitions for *Inter Partes* Review (“IPR”) of claims 1, 7, 9, 32, 38, and 40 (the “Challenged Claims”) of U.S. Patent No. 8,406,753 (“’753 Patent”). Compelling evidence presented in this Petition demonstrates at least a reasonable likelihood that Apple will prevail with respect to at least one of the Challenged Claims.

I. REQUIREMENTS FOR IPR UNDER 37 C.F.R. §42.104

A. Standing

Petitioner certifies that the ’753 Patent is available for IPR. Petitioner is not barred or estopped from requesting this review. Petitioner was served with a complaint of infringement of the ’753 Patent less than one year ago.

B. Challenge and Relief Requested

Petitioner requests IPR of the Challenged Claims on the 35 U.S.C. §103 grounds identified in the table below. Accompanying explanations and support are provided in Dr. Sundaresan’s Declaration. EX1003, ¶¶[1]-[113].

Ground	Claim(s)	§103 Combination
1	1, 7, 9, 32, 38, and 40	§103: Bhattacharya and Yost

The application that issued as the ’753 Patent was filed on February 5, 2008, and claims priority to a provisional application filed on February 5, 2007 (i.e., the “Critical Date”). EX1001, cover. While Petitioner does not concede that February

5, 2007 is the priority date that should be accorded to the '753 Patent, for the purposes of this proceeding, each of the references asserted in this Petition qualifies as prior art even if the "Critical Date" of the provisional application is used as the priority date of the '753 Patent.

Reference	Filing Date	Publication Date
Bhattacharya (EX1004)	03/15/2005	09/21/2006
Yost (EX1008)	08/12/1999	05/06/2003

II. OVERVIEW OF THE '753 PATENT

A. Brief Description

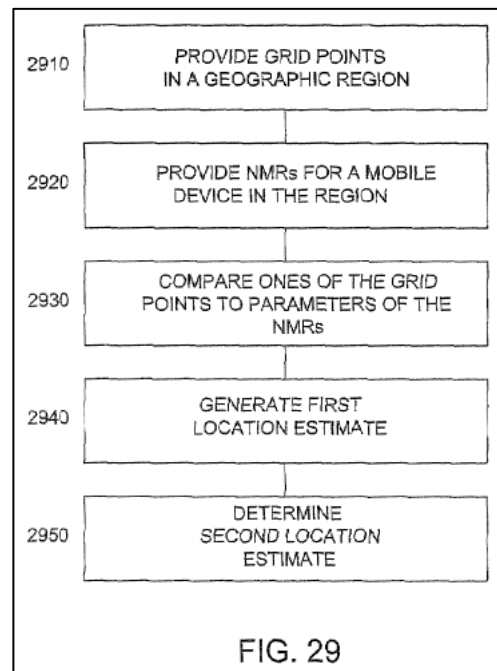
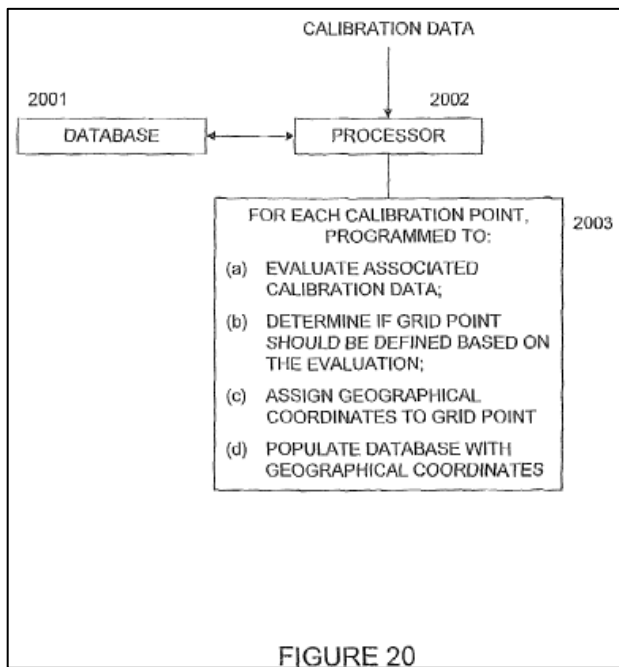
The '753 Patent is directed to "the problem of estimating the location of a wireless mobile device using information from one or more Network Measurement Reports ('NMRs') which may be generated by a wireless communications network or the mobile device." EX1001, 1:19-23. The '753 Patent notes that the proliferation of mobile devices and the prevalence of their use has increased the need to "determine the geographic position, or 'geolocate' a mobile device" for various reasons, including in emergency situations (e.g., during a 911 emergency telephone call), "roadside assistance, turn-by-turn driving directions, concierge services, location-specific billing rates and location-specific advertising." *See*

EX1001, 1:24-45.

The '753 Patent describes numerous known ways of determining the location of a mobile device based on measurements of “radio frequency (‘RF’) transmissions from mobile devices [received] at base station locations.” *See* EX1001, 46-65. Within this context, the '753 Patent purports to “streamline the process in order to efficiently and effectively handle the vast amount of data being sent between the wireless communications network and the large number of mobile devices for which locations are to be determined.” EX1001, 2:21-26. This streamlining is allegedly accomplished by:

estimating the location of a wireless mobile device using, at least in part, one or more pre-existing Network Measurement Reports (‘NMRs’) which include calibration data for a number of locations within a geographic region. The calibration data for these locations must be gathered and analyzed so that particular points (e.g., ‘grid points’) within the geographic region can be determined and associated with a particular set or sets of calibration data from, for example, one or more NMRs. Then, the received signal level measurements reported by the mobile device to be geolocated may be compared with the data associated with the various grid points to estimate the location of the mobile device.

EX1001, 2:26-39.



EX1001, FIGS 20, 29.

However, as described in greater detail below, these techniques were already well known in the art.

B. Relevant Prosecution History

The '753 Patent issued from US Application No. 12/026,480 (hereinafter “'480 Application”), which was filed on February 5, 2008. EX1002, 1, 196-403. In the single Office Action issued during prosecution of the '480 Application, the Examiner rejected original claims 1-10, 12-17, 29-41, 43-48, and 55-57 under 35 U.S.C. §§ 102 and 103 as anticipated or obvious based variously on U.S. App. Pub. No. 2005/0266855 (“Zeng”); U.S. Patent No. 6,564,065 (“Chang”); U.S. Patent No. 7,196,662 (“Misikangas”); U.S. Patent No. 7,167,714 (“Dressler”). EX1002, 50-56. The Examiner also indicated that claims 11, 18-28, 42, and 49-54 would be

allowable if rewritten in independent form. EX1002, 57.

In response, the Applicant did not amend the claims, but instead argued against the applicability of the prior art. *See* EX1002, 40-45. In doing so, the Applicant highlighted certain differences between Zeng and the claims. Specifically, the Applicant argued that “no grid points are generated within any geographic region in Zeng that is associated with a particular set or sets of calibration data. The claim specifically requires both calibration points and grid points; however, the Office has not made this distinction in its rejection and has thus misread the claim and misapplied the reference of record.” EX1002, 41-42. That is, the Applicant argued that there must be a distinction between the claimed “calibration data” and the “grid points” generated from the “calibration data.” *See id.*; EX1003, ¶[27]. The Applicant used similar logic to argue that Zeng does not select sets of grid points, as required by the independent claims. *See* EX1002, 43-44.

Additionally, the Applicant argued that there was a difference between the claimed “network measurement report (NMR)” and the receipt of “signal strength measurements from a mobile device.” *See* EX1002, 43. In making this argument, Applicant cited to paragraph [0007] of the published specification, which describes using “one or more pre-existing Network Measurement Reports (‘NMRs’) which include calibration data for a number of locations within a geographic region.” EX1002, 205. Relatedly, the ’753 Patent teaches that “the calibration data may be

contained within a Network Measurement Report (‘NMR’) *as is known in the art* or the calibration data may be obtained using other known methods.” EX1001, 9:53-56¹; EX1002, 218-219. Based on this teaching, Applicant argued that “a reception of RSSI values does not necessarily mean that an NMR is received; quite the contrary, RSSI values may be received for any number of reasons in any number of methods for an ultimate determination of a mobile device location.” EX1002, 43. Thus, the claims require the reception of one or more “Network Measurement Reports (‘NMRs’),” as that term was known in the art as of the Critical Date. EX1003, ¶[28].

The Examiner ultimately agreed with these arguments in a Notice of Allowance, noting only that “[c]laims 1-57 are allowed in view of the Applicants arguments of 12/20/2011.” EX1002, 13.

III. Level of Ordinary Skill in the Art

A person of ordinary skill in the art relating to the subject matter of the ’753 Patent as of February 5, 2007 (“POSITA”) would have had at least a Bachelor’s degree in electrical engineering, computer science, or a similar discipline, and at least two years of experience in the field working with working with navigation

¹ Emphasis added throughout, unless otherwise noted.

and/or geolocation systems. EX1003, ¶[8]. Superior education could compensate for a deficiency in work experience, and *vice-versa*. *Id.*

IV. CLAIM CONSTRUCTION—37 C.F.R. §42.104(b)(3)

All claim terms should be construed according to the Phillips standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. §42.100. Additionally, “claim terms need only be construed to the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011).

A claim construction order issued in a related district court proceeding involving the ’753 patent on July 19, 2023. EX1020. The Court issued constructions for the following terms recited in the Challenged Claims, including adopting constructions to which the parties stipulated (*see* EX1025):

’753 Patent Claim Term	D.Ct. Construction
“calibration points”	“Geographic points with which calibration data is associated” <i>See</i> EX1025, 1.
Order of “providing ...,” “generating ...,” “evaluating ...,” and “selecting ...” steps	Providing has to occur before generating, and generating has to occur before both evaluating and selecting.

	<i>See</i> EX1025, 2.
“calibration data”	“modified or unmodified network measurement data associated with a geographic location” <i>See</i> EX1020, 6-8.
“network measurement report”	“a report used in cellular networks which provides the results of a measurement from a mobile device on one or more cells” <i>See</i> EX1020, 17-18.
“grid point”	“a point associated with representative calibration data for an area” <i>See</i> EX1020, 18-20
“evaluating said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing parameters”; “evaluate said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing	Plain and ordinary meaning. <i>See</i> EX1020, 20-24.

parameters”	
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Because the Challenged Claims are anticipated and obvious under any reasonable interpretation (including the above) for the reasons set forth *infra* in §V, no express constructions are required in this proceeding.² To be clear, Apple reserves the right to address any construction proposed by Geoscope or the Board. Apple also reserves the right to pursue constructions in district court that are necessary to decide matters of infringement.

V. THE CHALLENGED CLAIMS ARE UNPATENTABLE

**A. GROUND 1: The Challenged Claims are obvious over
Bhattacharya**

1. Overview of Bhattacharya³

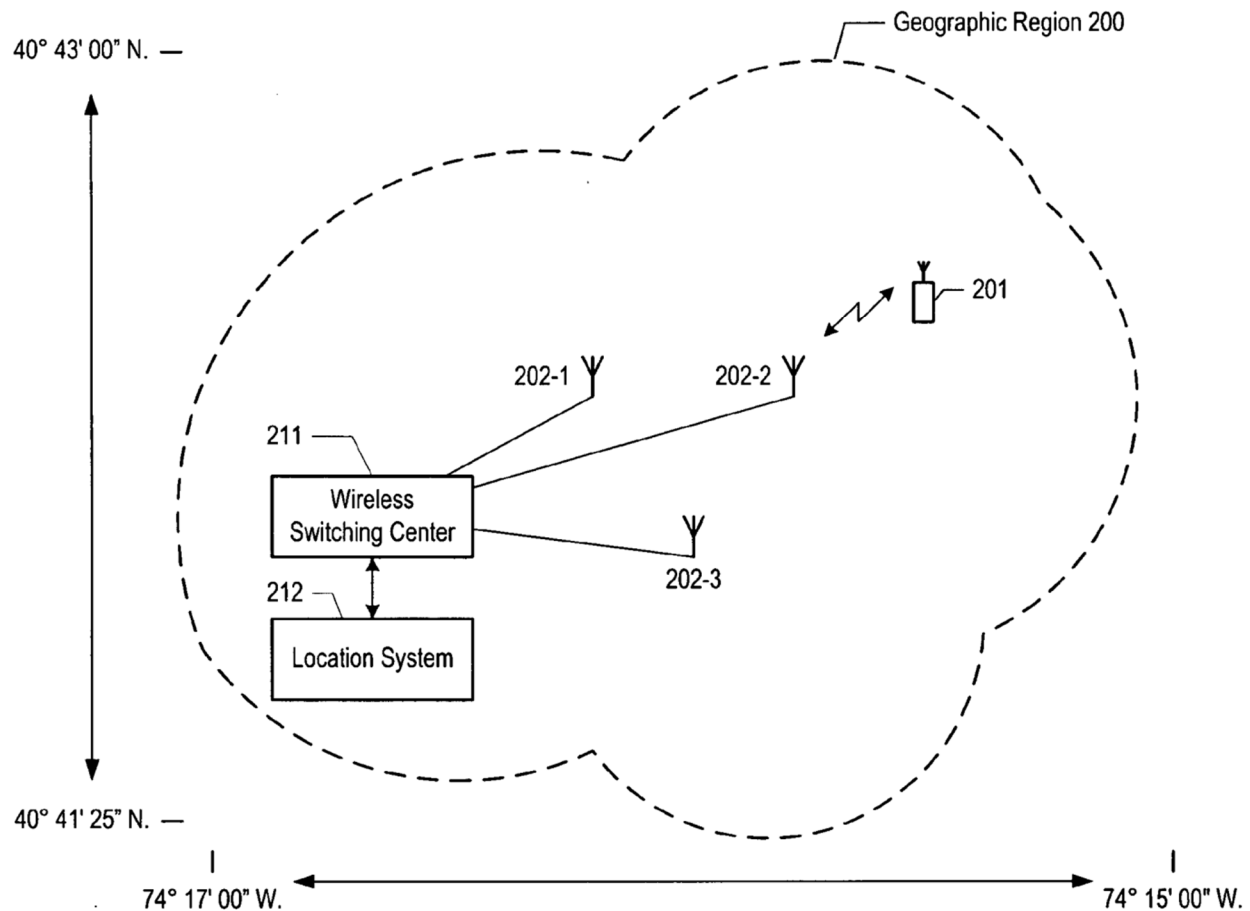
Bhattacharya is focused on estimating the location of a wireless terminal. EX1004, Abstract, EX1003, ¶[33]. Like the ’753 Patent, Bhattacharya notes that

² Apple is not conceding that each of the Challenged Claims satisfies all statutory requirements, such as 35 U.S.C. §112. Apple is not waiving any arguments concerning other grounds that can only be raised in district court.

³ General descriptions provided for this and other references and combinations thereof are incorporated into each subsection and mapping of the claims that includes citations to these references.

“[t]here are a variety of reasons why a remote party might be interested in knowing the location of the user,” including for dispatching emergency services (e.g., for a 911 emergency call). EX1004, [0007]; EX1001, 1:24-45. And like the location estimation techniques described in the ’753 Patent, Bhattacharya’s location estimation is generally based on “comparing the signal strength it currently observes against a map or database that correlates locations to signal strengths.” EX1004, [0014], [0023]; EX1001, 9:43-48 (“The location of a wireless mobile device may be estimated by comparing data reported by the mobile device to be geolocated with the data (and more particularly the characteristics derived from this data) associated with the various grid points to thereby estimate the location of the mobile.”).

Figure 2 (below) shows an example of the Bhattacharya system:



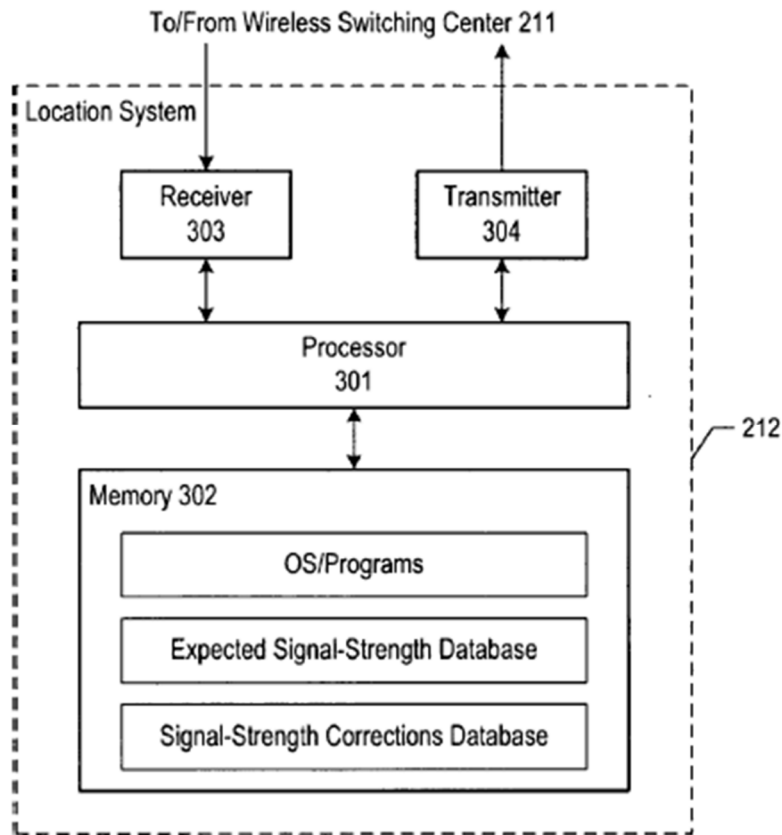
EX1004, FIG. 2

As shown above, telecommunications service is provided in geographic region 200 through base stations 202-1, 202-2, 202-3 and wireless terminal 201 through several well-known mobile communication protocols, such as Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS), Universal Mobile Telephone System (UTMS). EX1004, [0051]-[0056]. Wireless terminal 201 is equipped “with the software and hardware necessary to report to location system 212, via GPRS packets,” information, such as reported signal-strength measurements from nearby base stations. *Id.*, [0057]. Location

system 212 then “calibrate[s] the reported signal-strength measurements” in determining a location of the wireless terminal. *Id.*; EX1003, ¶[35].

Location system 212 is a “data processing system that is capable of estimating the location of wireless terminal 201[,]” or “any number of wireless terminals.” EX1004, [0059]. Location estimation involves “receiving reports” that “contain reported signal-strength measurements from wireless terminal 201 for the base stations that are on wireless terminal 201’s list of neighboring base stations.” *Id.*, [0060], [0160]. In some embodiments, “[t]he reported signal-strength measurements in a report are made at substantially the same time, and the signal-strength measurements in different reports are made at substantially different times[,]” while in others, “a single report comprises reported signal-strength measurements made at substantially different, but documented, times.” *Id.* A POSITA would have understood Bhattacharya contemplates generating signal-strength measurement reports in different ways, e.g., by wireless terminal 201 or wireless switching center 211, and at various times. EX1003, ¶[36].

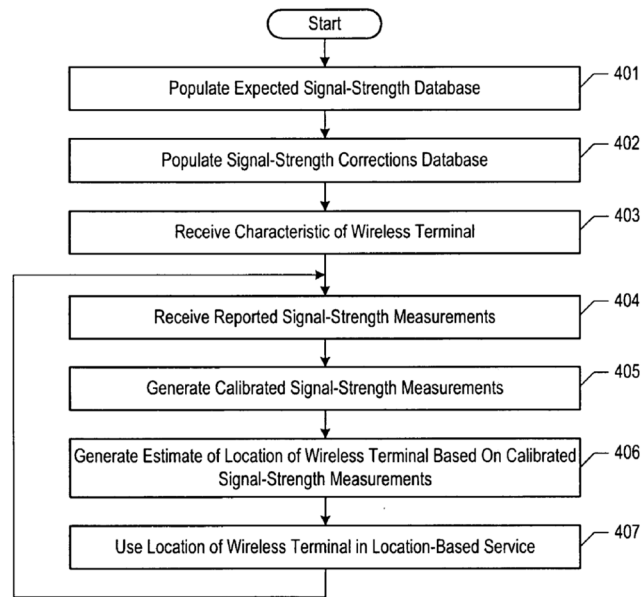
Figure 3 (below) provides a detailed view of Bhattacharya’s location system 212:



EX1004, FIG. 3

Location system 212 includes processor 301, memory 302, receiver 303, and transmitter 304. EX1004, [0064]. Processor 301 “execut[es] the operating system and user programs in memory 302, and of populating, amending, accessing, and generally managing [an] Expected Signal-Strength Database and [a] Signal-Strength Corrections Database in memory 302.” *Id.*; EX1003, ¶[38].

Figure 4 (below) shows an example of a location detection technique performed by location system 212.



EX1004, FIG. 4

The seven steps above reflect “[t]he overall process of estimating the location of wireless terminal 201,” which Bhattacharya informs can occur “concurrently,” “in a different order,” “together in one task,” or any combination. *See* EX1004, [0072]-[0076]; EX1003, ¶[40].

At task 401, “the Expected Signal-Strength Database is populated with the expected signal strengths of three signals at each location in geographic region 200[,]” including “Signal 1, Signal 2, and Signal 3.”⁴ EX1004, [0085]. Each

⁴ In its illustrative embodiment, Bhattacharya describes that the expected signal strength values E and reported signal strength values R are measured with respect to the three base stations illustrated in FIG. 2. *See* EX1004, [0055], [0060],

signal represents an “expected signal strength at location x, y at time t,” and “[f]or a given x, y location and time, these three functions together yield a 3-tuple of expected signal strengths designated as {E(1), E(2), E(3)}.” *Id.*, [0086]. Each expected signal-strength function is generated based on “a plurality of theoretical radio-frequency propagation models” and/or “plurality of empirical signal-strength measurements.” *Id.*, [0120]. This may involve “taking empirical measurements at various locations and by interpolating for the locations in between the sampled locations.” *Id.*, [0119]. Further, “[t]ask 401 is generally complex and can be potentially expensive,” and as a result, “performed only when necessary.” *Id.*, [0087]. Tasks 402 and 403 also involve calibrations to accommodate for “the make and model of wireless terminal.” EX1004, [0088]; *see id.*, [0089]-[0090]; APPLE -1003, ¶[41].

At task 404, “location system 212 periodically receives a Signal-Strength

[0085]-[0086]. However, a POSITA would have understood or at least found it obvious based on the teachings of Bhattacharya that these signal strength values/measurements can be taken with respect to any number of neighboring base stations, such that there would be any number of signals in each tuple of the expected signal strength values E and reported signal strength values R. *See* EX1004, [0055], [0060]; EX1003, pp. 27-28, n. 2.

Measurement Report from wireless terminal 202 at [a] discrete relative time[.]”

EX1004, [0091]. Each “Signal-Strength Measurement Report” (SSMR) includes “a tuple of reported signal-strength measurements $\{R(1,n), R(2,n), R(3,n)\}$,” “the real time, t , at which the signal-strength measurements were made,” and “a value of n , which indicates the relative order in which the signal-strength measurements are made.” *Id.*, [0092]-[0094]. Further, “wireless terminal 201 provides a temporal series ($n, n+1, n+2, \dots$, etc.)” of SSMRs “as part of the GSM protocol and the mobile-assisted hand-off process.” *Id.*, [0095]. Location system 212 calibrates the signal-strength measurements in the SSMRs based on the “calibration function for the make and model of wireless terminal 201,” to “correct—or compensate for—the signal strength measurement errors made by wireless terminal 201.” *Id.*, [0097]. The received tuple of signal-strength measurements $\{R(1,n), R(2,n), R(3,n)\}$ from the wireless terminal 201 becomes a tuple of calibrated signal-strength measurements $\{S(1,n), S(2,n), S(3,n)\}$, which is a function of $\{R(1,n), R(2,n), R(3,n)\}$ and the values in the calibration database created in step 402 for the make and model of wireless terminal 201. *See* EX1004, [0097], [0168]-[0169]; EX1003, ¶[42].

By the Critical Date, various wireless standards/protocols (including Bhattacharya’s preferred GSM protocol) utilized “Network Measurement Reports (NMRs)” to report signal strengths for nearby base stations, and such NMRs were

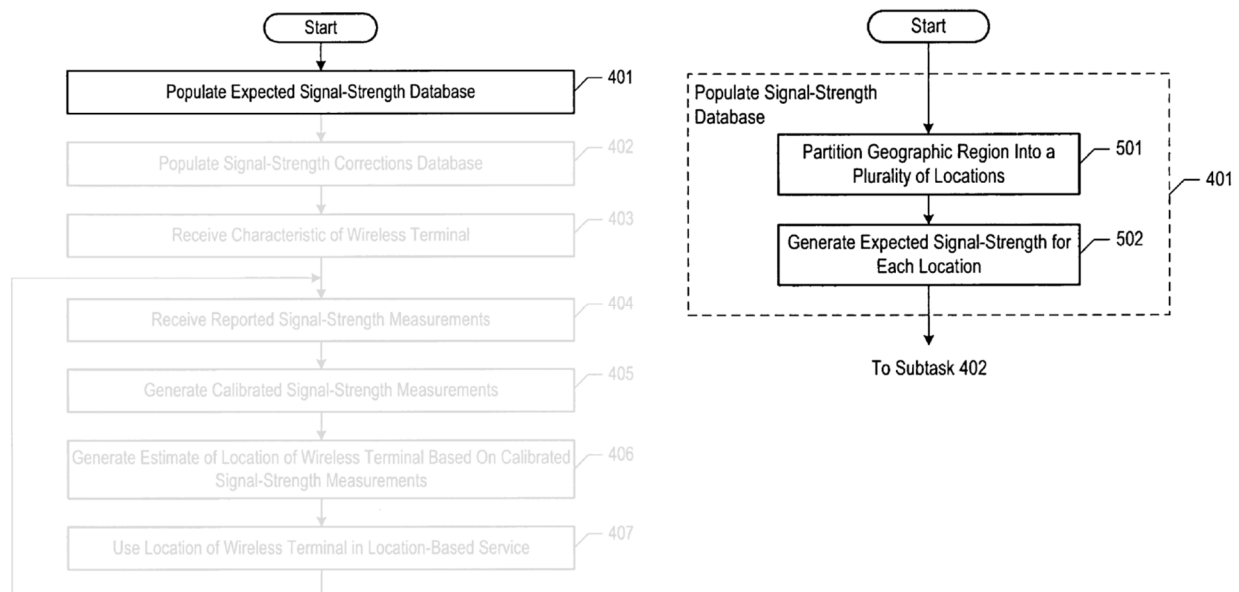
synonymous with—or at least one known form of—the “Signal-Strength Measurement Reports” described in Bhattacharya. *See, e.g.*, EX1006, 16:19-23 (relying upon “existing GSM Network Measurement Report (NMR)”), 20:11-20 (“The Measurement Report (MR) is sent periodically during an active voice or data session . . . and contains downlink (base station to mobile device) measurements on neighboring transmitters This technique, called mobile-assisted-handoff (MAHO), is common to most cellular radio networks including US TDMA (IS-136), CDMA, GSM, and UMTS.”); EX1007, 43 (“When in RR connected mode, the mobile station regularly sends MEASUREMENT REPORT messages to the network. These messages contain measurements results about reception characteristics from the current cell and from neighbour cells.”); EX1003, ¶[43].

A POSITA would have understood and found obvious that the “signal-strength measurements” contained in Bhattacharya’s “Signal-Strength Measurement Reports” would have been received, at least in part, from the well-known reception of NMRs standard in cellular radio networks (e.g., GSM). EX1003, ¶[44]. Because NMRs are regularly sent as a part of these various wireless standards (*see* EX1004, [0095]; EX1006, 20:11-20; EX1007, 43), a POSITA would have found it obvious to utilize the signal strength measurements contained in these NMRs, because they would provide the information required by Bhattacharya without the need to further add data or messages to the existing

cellular radio networks. EX1003, ¶[44].

At task 406, “location system 212 generates a current estimate of the location of wireless terminal 201” based on “the tuple of calibrated signal-strength measurements $\{S(1,n), S(2,n), S(3,n)\}$,” “expected signal-strength tuples for all locations $\{E(1,x,y,t), E(2,x,y,t), E(3,x,y,t)\}$ at the time when the measurements underlying $\{S(1,n), S(2,n), S(3,n)\}$ were made,” and “the cumulative probability distribution for the location of wireless terminal 201...based on all of the [SSMRs] up to and including Report n-1.” EX1004, [0098]-[0101]. At task 407, location system 212 “transmits the location estimated in task 406 to another entity” for “use in a location-based served (e.g., Emergency 911 Service, etc.).” *Id.*, [0103]; EX1003, ¶[45].

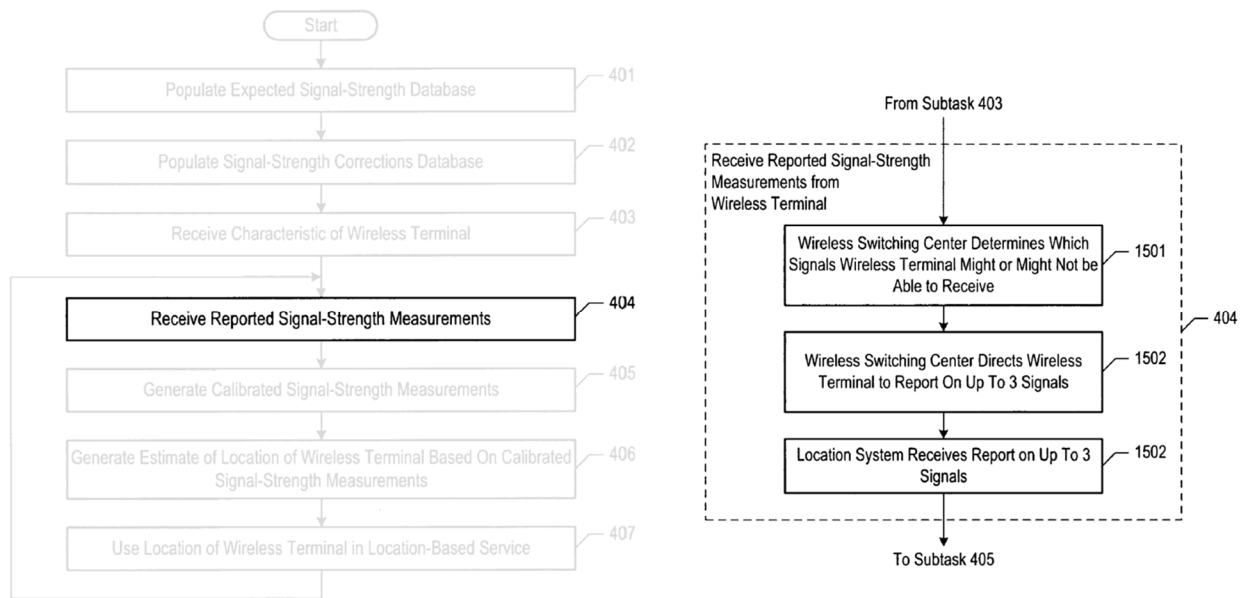
Figure 5 (below, right) provides additional detail on task 401 (below, left).



EX1004, FIG. 4 (left) and FIG. 5 (right)

At subtask 501, “a rectangular grid of X by Y tessellated squares is overlaid onto geographic region 200” where “each square represents a location.” EX1004, [0106]. At subtask 502, “expected signal-strength functions $E(1,x,y,t)$, $E(2,x,y,t)$, $E(3,x,y,t)$ ” are generated based on a combination of “a plurality of theoretical radio-frequency propagation models” and “a plurality of empirical signal-strength measurements.” *Id.*, [0112]-[0117]; EX1003, ¶[47]. The expected signal strength functions are “a function of x and y” since “the topography of [a] region and the presence of buildings, trees, and other radio-frequency obstacles severely alter” signal propagation. EX1004, [0113]. Further, “expected signal strength at each location is dynamic and changes,” *e.g.*, “with time as the atmospheric and meteorological conditions change[,]” which is why “expected signal-strength functions are a function of time.” *Id.*, [0014]; EX1003, ¶[47].

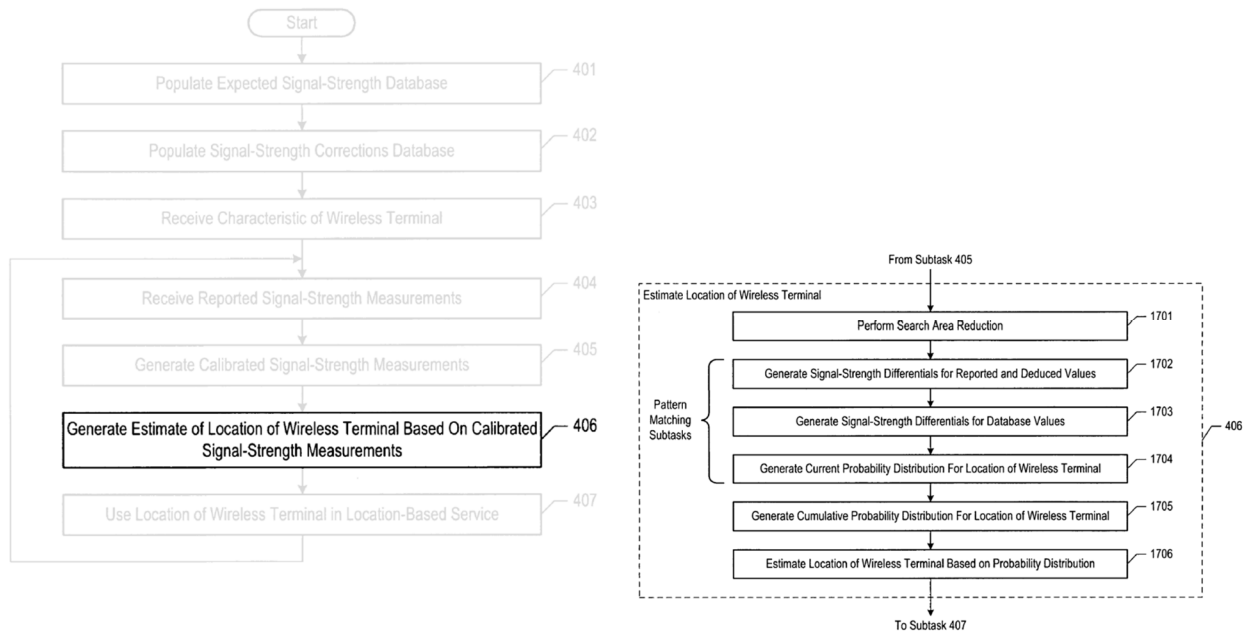
Figure 15 (below, right) provides additional detail on task 404 (below, left).



EX1004, FIG. 4 (left) and FIG. 15 (right)

Subtasks 1501 and 1502 relates to coordination between wireless switching center 211 and wireless terminal 201, which permits wireless terminal 201 “to attempt to receive and to report back a signal-strength value for the signals that wireless terminal 201 is able to receive and distinguish.” EX1004, [0159]. At subtask 1503, location system 212 receives an SSMR from wireless terminal 201 that includes “a tuple of reported signal-strength measurements $\{R(1,n), R(2,n), R(3,n)\}$,” “the time, t , at which the signal-strength measurements were made,” and “a value of n , which indicates the relative order in which the signal-strength measurements are made.” *Id.*, [0160]-[0163]; EX1003, ¶[49].

Figure 17 (below, right) provides additional detail on task 406 in Figure 4 (below, left).

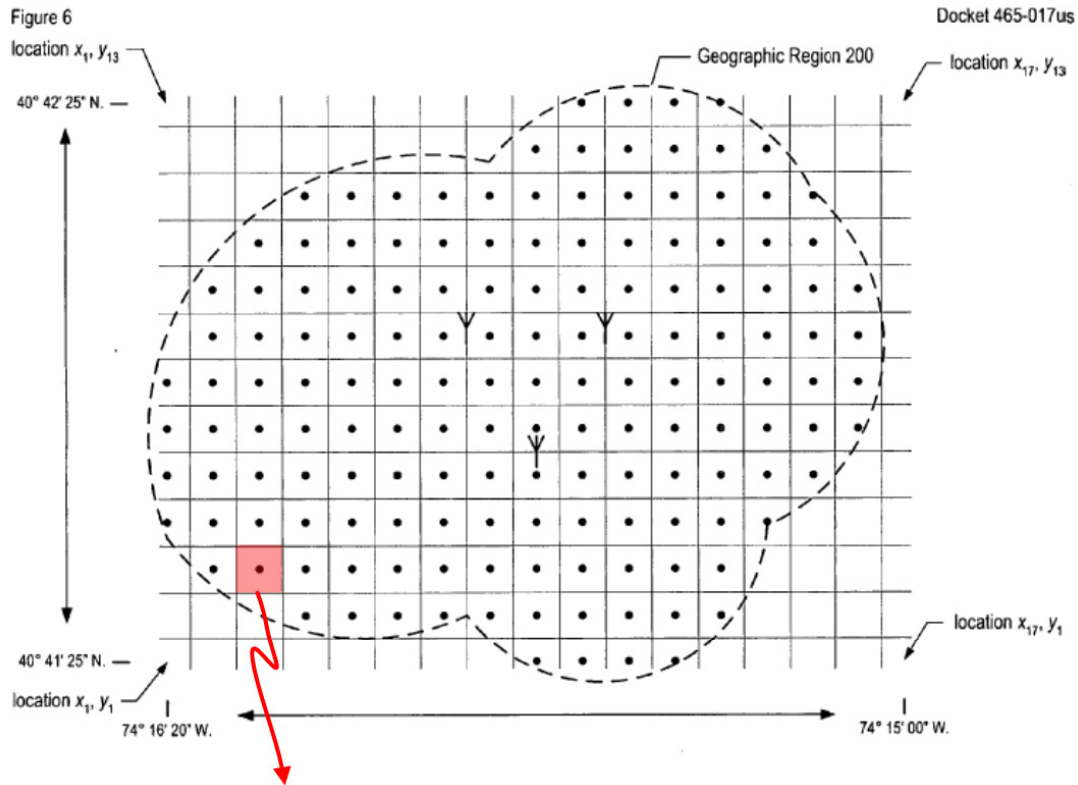


EX1004, FIG. 4 (left) and FIG. 17 (right)

As shown above, at subtask 1701, processor 301 (of location system 212) uses “search area reduction” to “reduce the number of candidate locations that must be processed” by excluding candidates with a probability “calculated to be very close to zero.” EX1004, [0173].

The reduction is dictated by Equation 6, which a POSITA would have understood is a direct comparison of a given received calibrated signal tuple (*e.g.*, $\{S(1, n), S(2, n), S(3, n)\}$), as well as a discrete number Ω of the previously received calibrated signal tuples, against each of the expected signal tuples in the entire search area. *See* EX1004, [0173]-[0174]; EX1003, ¶[52]. If the difference between all Ω of the recently received calibrated signal tuples and the expected signal value E for a given location (x, y) is greater than a threshold value Ψ , then it

is assumed that the probability that the mobile terminal is at location (x, y) is very low. *Id.* An example of this calculation is illustrated below, where Ω (i.e., the number of previously received signal strength reports used in this calculation) is assumed to be 3 for the sake of simplicity. EX1003, ¶[52].



For each of the grid points within the geographic area, including location (x_3, y_3) highlighted in red, **exclude the location if and only if:**

- $E(1, x, y, t) - S(1, n) \geq \Psi$; AND
- $E(1, x, y, (t @ n-1)) - S(1, n-1) \geq \Psi$; AND
- $E(1, x, y, (t @ n-2)) - S(1, n-2) \geq \Psi$; AND
- $E(1, x, y, (t @ n-3)) - S(1, n-3) \geq \Psi$; AND
- $E(2, x, y, t) - S(2, n) \geq \Psi$; AND
- $E(2, x, y, (t @ n-1)) - S(2, n-1) \geq \Psi$; AND
- $E(2, x, y, (t @ n-2)) - S(2, n-2) \geq \Psi$; AND
- $E(2, x, y, (t @ n-3)) - S(2, n-3) \geq \Psi$; AND
- $E(3, x, y, t) - S(3, n) \geq \Psi$; AND
- $E(3, x, y, (t @ n-1)) - S(3, n-1) \geq \Psi$; AND
- $E(3, x, y, (t @ n-2)) - S(3, n-2) \geq \Psi$; AND
- $E(3, x, y, (t @ n-3)) - S(3, n-3) \geq \Psi$

EX1004, FIG. 6
(highlighting subtask 1701 with annotations shown in blue and red)

Once processor 301 reduces the number of candidate locations in subtask 1701, it begins the subtasks related to generating the probability that the received signals are associated with each of the remaining locations within the geographic area. *See generally* EX1004, [0179]-[0207], EX1003, ¶[53]. However, unlike in subtask 1701, processor 301 does not directly compare the received calibrated signal tuple S (e.g., $\{S(1, n), S(2, n), S(3, n)\}$) with the expected signal tuples E (e.g., $\{E(1, x, y, t), E(2, x, y, t), E(3, x, y, t)\}$) for each of the remaining candidate locations. *See* EX1004, [0179]-[0189], [0195], EX1003, ¶[53]. Instead, in subtasks 1702 and 1703, the processor 301 converts the received calibrated signal tuple S and the expected signal tuples E for each of the candidate locations into a set of differentials ΔN and ΔE that are comparisons of adjusted signals within each tuple.⁵ EX1004, [0179]-[0188]; EX1003, ¶[53].

⁵ Bhattacharya describes embodiments where signal-strength measurements deemed “saturated” (“at one of the bounds of the range at which a measurement can be reported,” e.g., -47 dBm, -110dBm) are removed prior to computing signal-strength differentials since “their saturated nature prevents the true magnitude they represent from being known with enough certainty...” EX1004, [0179], [0180].

In Bhattacharya, the purpose of generating and comparing signal-strength differentials ΔN and ΔE (as opposed to directly comparing calibrated signal tuple S and expected signal tuples E) is that “various factors including the condition of the wireless terminal’s antenna, the state of its battery, and whether the terminal is inside a vehicle” can affect the reported signals for a wireless terminal, even when it is the same make and model and at the same location. *See* EX1004, [0021]-[0023]; EX1003, ¶[54]. By comparing signal-strength differentials (ΔN and ΔE), these biases owing to the state of the wireless terminal can be ameliorated. *See id.*

Generation of the signal-strength differentials (ΔN and ΔE) is provided in equations 7 and 8. *See* EX1004, [0181]-[0188]. An example of a differential ΔN

Yet Bhattacharya also contemplates other embodiments where signal-strength measurements are provided as “GPRS packet data and these reported signal-strength measurements are not [] bounded by the -47 dBm to -110 dBm domain limitation imposed on GSM terminals...” *Id.*, [0164]. Thus, a POSITA would have understood and found obvious that, embodiments of Bhattacharya that use GPRS packets for communication are not subject to saturation, and therefore, would not require removal prior to computing signal-strength differential. EX1003, p. 37-38, n. 3. For simplicity, the description of Bhattacharya that follows assumes there are no saturated values. *Id.*

for received calibrated signal tuple S and a differential ΔE for an expected signal tuples E at location x_1, y_1 is shown below:

$$\Delta N = [\{S(2, n) - S(1, n)\}, \{S(3, n) - S(2, n)\}]$$

$$\Delta E = [\{E(2, x_1, y_1, t) - E(1, x_1, y_1, t)\}, \{E(3, x_1, y_1, t) - E(2, x_1, y_1, t)\}]$$

where ‘t’ is the time at which the measurements underlying $\Delta N(k, n)$ were made.

See EX1004, [0181]-[0188]; EX1003, ¶[55]. In this example, each of the signal strength differentials (ΔN and ΔE) has two elements ($m-1$), instead of the three (m) in associated signal tuple S and E, respectively. EX1004, [0181].

At subtasks 1704 and 1705, processor 301 generates probability distributions for the “location of wireless terminal 201” (in subtask 1704, a probability distribution is based on the “most recently received reported signal-strength measurements; in subtask 1705, a probability distribution is based on “all of the received reported signal-strength measurements”). EX1004, [0189].

As described above with respect to subtasks 1702 and 1703, each of these probabilities are based on statistical comparisons of signal strength differentials (ΔN and ΔE), instead of the received calibrated signal tuples S and expected signal tuples E, though the signal strength differentials (ΔN and ΔE) are simply functions of the tuples S and E. *See* EX1004, [0189]-[0206]; EX1003, ¶[57].

At subtask 1706, the probability distributions are evaluated to estimate the location of wireless terminal 201. EX1004, [0207]. The estimation is

accomplished by “pattern matching the pair-wise differentials of the calibrated signal strengths to the pair-wise differentials of the expected signal strengths.” EX1004, [0023], [0024], [0127]; EX1003, ¶[58]. In essence, the probability distribution for the most recently received signal strength report (generated in subtask 1704) are combined with “aged” versions of the probability distribution for previously received signal strength reports from the same wireless terminal 201 (generated in subtask 1705), and then selecting the location associated with the greatest probability. *See* EX1004, [0195]-[0207]; EX1003, ¶[58].

2. Overview of Yost

Like Bhattacharya, Yost describes “profiling the location of mobile radio traffic across a coverage area served by one or more base transceiver stations.” EX1008, 1:8-12. In Yost, “[s]ignal strength measurements at test sites (40) of interest within the coverage area (50) are made and compared with signal strength measurements taken from operating MRs (12).” EX1008, abstract. Thus, in both Bhattacharya and Yost, the described system estimates the location of a mobile device based on a comparison between signal strength measurements taken from the mobile device and a database of “expected” signal strengths (as they are called in Bhattacharya) or “calibration measurements” (as they are called in Yost) associated with known locations. EX1003, ¶[59].

In Yost’s location estimation method, there are three phases: “a calibration

phase, a capture phase and a data analysis phase.” EX1008, 6:36-40. “During the calibration phase, the network manager is able to obtain calibration data for all [mobile radio] MR frequencies within the coverage area 50 (step 62).” EX1008, 6:40-42. During the capture phase, “signal strength measurements are made from all MR 12 within the coverage area 50 (step 64).” EX1008, 6:42-44. “The data analysis phase amounts to a comparison of the captured data from the MR 12 with the calibration data (step 66).” EX1008, 6:45-47. This process is similar to that described by Bhattacharya. EX1003, ¶[60].

Yost’s location estimation method requires “a set of prior measurements of the signal strengths of each [base transceiver station] BTS 26A, 26B that can be received with adequate signal strength” EX1008, 5:42-45. These prior measurements are gathered during the “calibration phase” and referred to as “calibration data.” *See* EX1008, 5:42-60. Yost describes that “[c]alibration measurements are made by a testing device frequently and at a plurality of positions within and around locations of interest in order to determine the effects of fading within the coverage area of the network 10 and, in particular, the service area of the BTS 26.” EX1008, 5:12-16. Preferably, the calibration measurements “are made so as to duplicate as closely as possible the conditions of actual users.” EX1008, 5:16-18. “The measurements must include a record of the position of the testing device when the measurement was recorded.” EX1008, 5:23-24.

Yost describes that “the calibration data containing the measured and recorded signal strength measurements are averaged within each of a plurality of small areas (step 82) and a standard set of signal strength measurements is determined (step 84), which would apply across the coverage area of interest.” EX1008, 7:28-33. In other words, “[t]he calibration signal strengths measure an average over small areas of a pre-determined size.” EX1008, 7:50-51. A POSITA would have understood and found it obvious that these small areas of a pre-determined size covering a coverage area of interest would look similar to the grid and grid points shown in Bhattacharya’s FIG. 6. EX1003, ¶[62].

Thus, for each of these “small areas” within the coverage area of interest, Yost describes collecting multiple signal strength measurements within one or more of the “small areas” and averaging those multiple signal strength measurements to create a single representative signal strength measurement for the small area. *See* EX1008, 7:28-56; EX1003, ¶[63]. Yost describes at least two advantages of this averaging technique as compared to taking a single measurement per “small area”: (1) “the fluctuations observed for each BTS (serving and neighboring) about the average can be recorded and used to determine tolerances” (e.g., “standard deviations from the average”); and (2) the averaging can remove “some of the effects of fast fading.” *See* EX1008, 7:40-56; EX1003, ¶[63].

3. Motivation for Combining Bhattacharya and Yost

As described above, both Bhattacharya and Yost describe systems for estimating the location of a mobile device based on a comparison between signal strength measurements taken from the mobile device and a database of “expected” signal strengths (as they are called in Bhattacharya) or “calibration measurements” (as they are called in Yost) associated with known locations. EX1003, ¶[64]. This is also the same technique described in the ’753 Patent. *See, e.g.*, EX1001, 2:26-39; EX1003, ¶[64]. Thus, each of Bhattacharya and Yost are in the same field of art as the ’753 Patent. EX1003, ¶[64].

Bhattacharya describes that “the expected signal strength at each location is generated by taking empirical measurements at various locations and by interpolating for the locations in between the sampled locations.” EX1004, [0119]. However, Bhattacharya does not specifically describe how the empirical measurements at various locations are taken, leaving these details to the skill and knowledge of a POSITA. *See id.*; EX1003, ¶[65]. Yost provides one known example for collecting the empirical measurements required by Bhattacharya. EX1003, ¶[65].

Like the grid of expected values described by Bhattacharya, Yost describes collecting calibration measurement “within each of a plurality of small areas . . . across the coverage area of interest.” EX1008, 7:28-33. Based on the teachings of

Yost, a POSITA would have found it obvious that at least one known way of collecting the empirical measurements required by Bhattacharya would be: (1) moving one or more test devices throughout the geographical region of interest to collect “a set of ‘calibration’ data points or signal strength measurements;” and (2) for at least one of the “small areas” within the geographical region of interest, averaging multiple measured and recorded signal strength measurements taken within the small area. *See* EX1008, 6:63-7:67; EX1003, ¶[66].

A POSITA would have been motivated to utilize Yost’s known techniques in the context of Bhattacharya for several reasons. EX1003, ¶[67]. First, Yost describes that by averaging multiple measured and recorded signal strength measurements taken within the small areas of the geographical region of interest the system gains two advantages: (1) “the fluctuations observed for each BTS (serving and neighboring) about the average can be recorded and used to determine tolerances” (e.g., “standard deviations from the average”); and (2) the averaging can remove “some of the effects of fast fading.” *See* EX1008, 7:40-56; EX1003, ¶[67]. A POSITA would have recognized that these advantages would have applied equally to Bhattacharya’s similar location estimation methods. EX1003, ¶[67]. Thus, the use of Yost’s techniques to implement Bhattacharya’s system and methods is simply the use of a known technique (Yost’s calibration phase) to improve similar location estimation methods in the same way. EX1003, ¶[67].

Second, the above-described use of Yost’s techniques is simply the combination of prior art elements (i.e., Yost’s calibration phase collection and averaging techniques with Bhattacharya’s similar location estimation system) according to known methods to yield predictable results. EX1003, ¶[68]. Both Bhattacharya and Yost are in the predictable art of computer-based location estimation for wireless communication systems, and the techniques described in each rely upon determinative math and programming techniques that would have been well within the skill of a POSITA to predictably implement and achieve predictable results. EX1003, ¶[68].

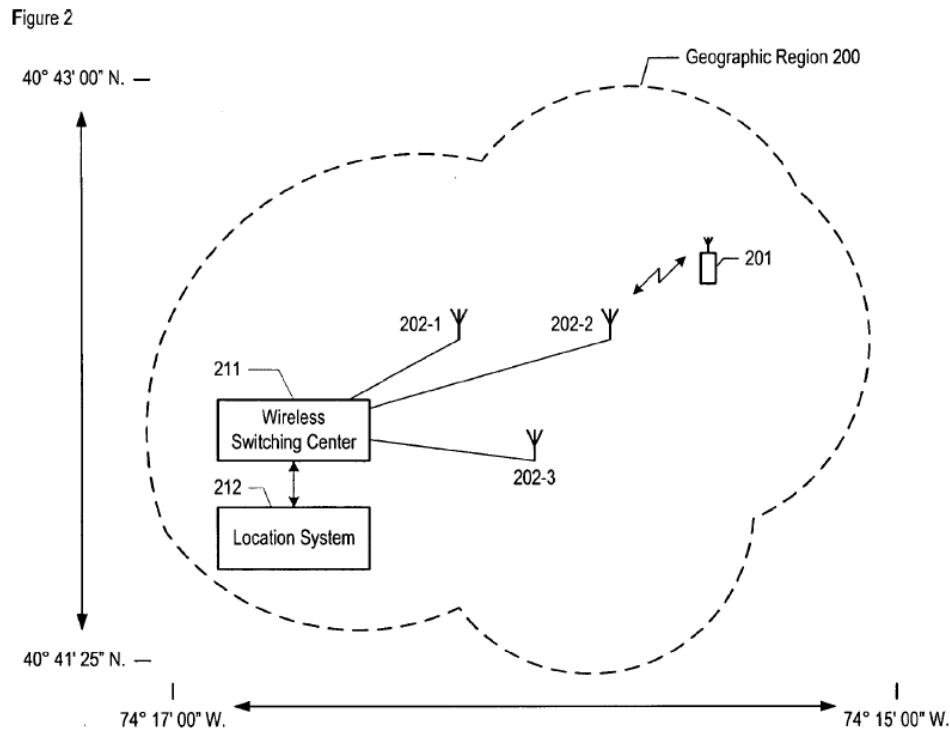
**4. Manner in Which Bhattacharya in view of Yost
Render the Challenged Claims Obvious**

Claim 1

[1pre]

To the extent the preamble is limiting (which Petitioner does not concede), Bhattacharya describes [1pre]. EX1003, ¶¶[69]-[70]. Bhattacharya describes that its “invention relates to telecommunications in general, and, more particularly, to a technique for estimating the location of a wireless terminal.” EX1004, [0001]. More specifically, Bhattacharya’s technique “enables the estimation of the location of a wireless terminal without the addition of hardware to either the wireless terminal or to the telecommunication system’s base stations.” EX1004, [0013]. “FIG. 4 depicts a broad overview of the salient tasks performed by the illustrative

embodiment in estimating the location of wireless terminal 201 in geographic region 200.” EX1004, [0030].



EX1004, FIG. 2

[1a]

Bhattacharya and Yost describe and render obvious [1a]. EX1003, ¶¶[71]-[75]. In general, Bhattacharya describes that its “illustrative embodiment of the present invention is based on the observation that the signal strength of a signal from a transmitter is different at some locations, and, therefore, the location of a wireless terminal can be estimated by comparing the signal strength it currently observes against a map or database that correlates locations to signal strengths.” EX1004, [0014]. This database is referred to as the “Expected Signal-Strength

Database.” *See* EX1004, [0085].

The “Expected Signal-Strength Database is populated with the expected signal strengths of three signals at each location in geographic region 200.” EX1004, [0085]. Each of the three signals is the control channel broadcast by a corresponding base station (e.g., 202-1, 202-2, 202-3) “and its expected signal strength at location x,y at time t ,” which is represented by the function $E(k,x,y,t)$, where k is the designation of the signal. *See* EX1004, [0086]; EX1003, ¶[72].

“In general, the signal strength of an electromagnetic signal decreases as a function of the distance from the transmitter, as is depicted in FIG. 1a, but the topography of the region and the presence of buildings, trees, and other radio-frequency obstacles severely alters this generalization, as is depicted in FIG. 1b.” EX1004, [0113]. Further, the signal strength can change with time. EX1004, [0114]. The “expected signal-strength functions $E(1,x,y,t)$, $E(2,x,y,t)$, and $E(3,x,y,t)$ are generated based on a combination of: (i) a plurality of theoretical radio-frequency propagation models, and (ii) a plurality of empirical signal-strength measurements.” EX1004, [0115]-[0117]. “In accordance with another well-known model, the expected signal strength at each location is generated by taking empirical measurements at various locations and by interpolating for the locations in between the sampled locations.” EX1004, [0119].

For at least the reasons described in V.A.3, *supra*, POSITA would have

understood or at least found it obvious that Bhattacharya's empirical measurements taken at various locations and used to generate the expected signal strength at each location is the claimed "calibration data for each of one or more calibration points in a geographic region." *See* EX1004, [0120]-[0123]; EX1003, ¶[74]. As demonstrated by Yost, at least one known method of collecting the empirical measurements described by Bhattacharya would have been to transport testing devices around the geographic region 200 and measure the signal strength for each of the three signals received from the three base stations (202-1, 202-2, and 202-3) and the geographic location of the testing device (e.g., using a GPS receiver connected to the testing device) in order to determine the (x,y) associated with each of the three signals. *See, e.g.*, EX1008, 5:12-27, 5:50-60, 7:6-21; EX1003, ¶[74].

Bhattacharya describes that the empirical measurements (i.e., the claimed calibration data) has one or more characterizing parameters. EX1003, ¶[75]. For example, Bhattacharya describes that the empirical measurements may include "signal strength measurements" at a given location. EX1004, [0115]-[0117]; EX1003, ¶[75]. In other words, at least one "characterizing parameter" of the empirical measurement is the signal strength of signals received from each of the surrounding base stations. *See* EX1004, [0115]-[0117]; EX1008, 7:6-21; EX1003, ¶[75]. Another "characterizing parameter" of the empirical measurement is the

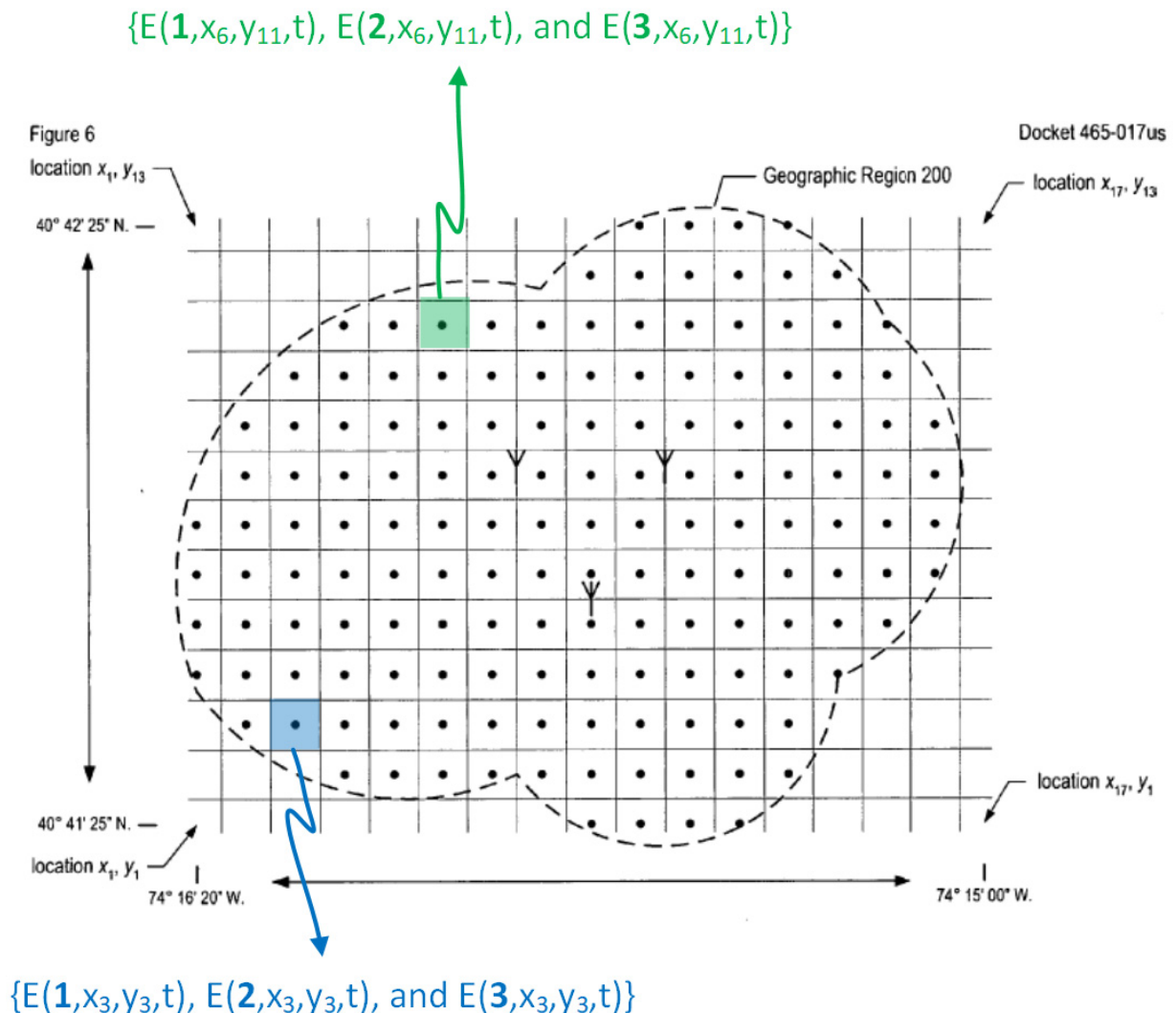
location at which the measurement was taken. *See id.* Another “characterizing parameter” of the empirical measurement is the time at which the measurement was taken. *See* EX1004, [0114]-[0115]; EX1003, ¶[75].

[1b]

Bhattacharya and Yost describe and render obvious [1b]. EX1003, ¶¶[76]-[80]. As described above with respect to [1a], the empirical measurements described by Bhattacharya (i.e., the claimed “calibration data”) are used to generate “expected signal-strength functions $E(1,x,y,t)$, $E(2,x,y,t)$, and $E(3,x,y,t)$.” EX1004, [0115]-[0117]. Specifically, Bhattacharya describes that “rectangular grid of X by Y tessellated squares is overlaid onto geographic region 200 (see FIG. 6) and the center of each square represents a location.” EX1004, [0106]. This process is consistent with the manner in which the specification and claims of the ’753 Patent describes the generation of grid points. EX1003, ¶[76].

Bhattacharya describes associating expected signal-strength functions $\{E(1,x,y,t), E(2,x,y,t), \text{ and } E(3,x,y,t)\}$ with each of the grid points within the region 200. *See* EX1004, [0106]-[0117], [0123] (“It will be clear to those skilled in the art, after reading this disclosure, how to generate the expected signal-strength functions for each location in the geographic region”); EX1003, ¶[77]. In other words, once the expected signal-strength functions have been associated with them, the point at the center of each of these grid squares is a “grid point,” as

claimed. The collection of all the generated expected signal-strength functions for each of the grid points makes up the “Expected Signal-Strength Database.” See EX1004, [0078], [0085]-[0086], [0105]; EX1003, ¶[77].



Annotated FIG. 6 of EX1004

Bhattacharya describes that “the expected signal strength at each location is generated by taking empirical measurements at various locations and by interpolating for the locations in between the sampled locations.” EX1004, [0119].

As described in Section V.A.3 and with respect to [1a], it was well-known to POSITAs as of the Critical Date that at least one method of collecting the empirical measurements described by Bhattacharya would have been to transport testing devices around the geographic region 200 and measure the signal strength for each of the three signals received from the three base stations (202-1, 202-2, and 202-3) and the geographic location of the testing device (e.g., using a GPS receiver connected to the testing device) in order to determine the (x,y) associated with each of the three signals. *See, e.g.*, EX1008, 5:12-27, 5:50-60, 7:6-21; EX1003, ¶[78].

Furthermore, as described in Sections V.A.2-3, *supra*, at least one known method of generating expected signal strength for a geographic point would have been to collect multiple empirical measurements within the grid square surrounding the geographic point and average the multiple empirical measurements. *See, e.g.*, EX1008, 7:28-44; EX1003, ¶[79]. By averaging multiple empirical measurements within the grid square surrounding the geographical location of the ultimately generated grid point, a POSITA would have understood or at least found it obvious that some of the effects of fast fading could be removed. *See, e.g.*, EX1008, 7:50-56; EX1003, ¶[80]. In this regard, a POSITA would have understood or at least found it obvious that the expected signal-strength functions $\{E(1,x,y,t), E(2,x,y,t), \text{ and } E(3,x,y,t)\}$ for a given grid point

within the geographic region 200 may represent an average of calibration data from multiple locations within the grid square, and not simply represent the storage of the calibration data itself. *See id.*

[1c]

Bhattacharya describes or at least renders obvious [1c]. EX1003, ¶¶[81]-[83]. Bhattacharya describes that the “process of estimating the location of wireless terminal 201 comprises seven tasks,” the fourth of which is “receiving the reported signal-strength measurements from wireless terminal 201.” EX1004, [0077]-[0081]. Because the received signal-strength measurements are being used to estimate the location of wireless terminal 201, a POSITA would have understood or at least found it obvious that the wireless terminal 201 is at an unknown location in said geographic region when the received signal-strength measurements are received. *See* EX1004, [0059]-[0060], [0127]; EX1003, ¶[81].

More specifically, at “task 404, location system 212 periodically receives a Signal-Strength Measurement Report from wireless terminal 201 at discrete relative time n , wherein n is a non-negative integer.” EX1004, [0091]. “Signal-Strength Measurement Report n comprises: i. a tuple of reported signal-strength measurements $\{R(1,n), R(2,n), R(3,n)\}$, ii. the real time, t , at which the signal-strength measurements were made, and iii. a value of n , which indicates the relative order in which the signal-strength measurements are made.” EX1004,

[0091]-[0094]. “To facilitate this, wireless terminal 201 provides a temporal series (n, n+1, n+2, . . . , etc.) of Signal-Strength Measurement Reports to wireless switching center 211, in well-known fashion, as part of the GSM protocol and the mobile-assisted hand-off process.” EX1004, [0095].

As described in Section V.A.1, *supra*, it was well known as of the Critical Date that various wireless standards/protocols (including Bhattacharya’s preferred GSM protocol) utilize “Network Measurement Reports (NMRs)” to report signal strengths with respect to one or more nearby base stations, and that such NMRs would either have been synonymous with or at least one known form of the “Signal-Strength Measurement Reports” upon which Bhattacharya’s systems and methods rely to estimate a mobile terminals location. *See, e.g.*, EX1006, 16:19-23 (relying upon “existing GSM Network Measurement Report (NMR)”), 20:11-20 (“The Measurement Report (MR) is sent periodically during an active voice or data session . . . and contains downlink (base station to mobile device) measurements on neighboring transmitters This technique, called mobile-assisted-handoff (MAHO), is common to most cellular radio networks including US TDMA (IS-136), CDMA, GSM, and UMTS.”); EX1007, 43 (“When in RR connected mode, the mobile station regularly sends MEASUREMENT REPORT messages to the network. These messages contain measurements results about reception characteristics from the current cell and from neighbour cells.”); EX1003, ¶[83]. A

POSITA would have understood or at least found it obvious that the “reported signal-strength measurements” contained in “Signal-Strength Measurement Reports” described by Bhattacharya would have been received, at least in part, from the well-known reception of the NMRs that are standard in various cellular radio networks (e.g., GSM). EX1003, ¶[83]. Because these NMRs are regularly sent as a part of these various wireless standards (*see* EX1004, [0095]; EX1006, 20:11-20; EX1007, 43), a POSITA implementing Bhattacharya’s system and method would have found it obvious to utilize the signal strength measurements contained in these NMRs, because they would provide the information required by Bhattacharya without the need to further add data or messages to the existing cellular radio networks. EX1003, ¶[83].

[1d]

Bhattacharya describes or at least renders obvious [1d]. EX1003, ¶¶[84]-[88].

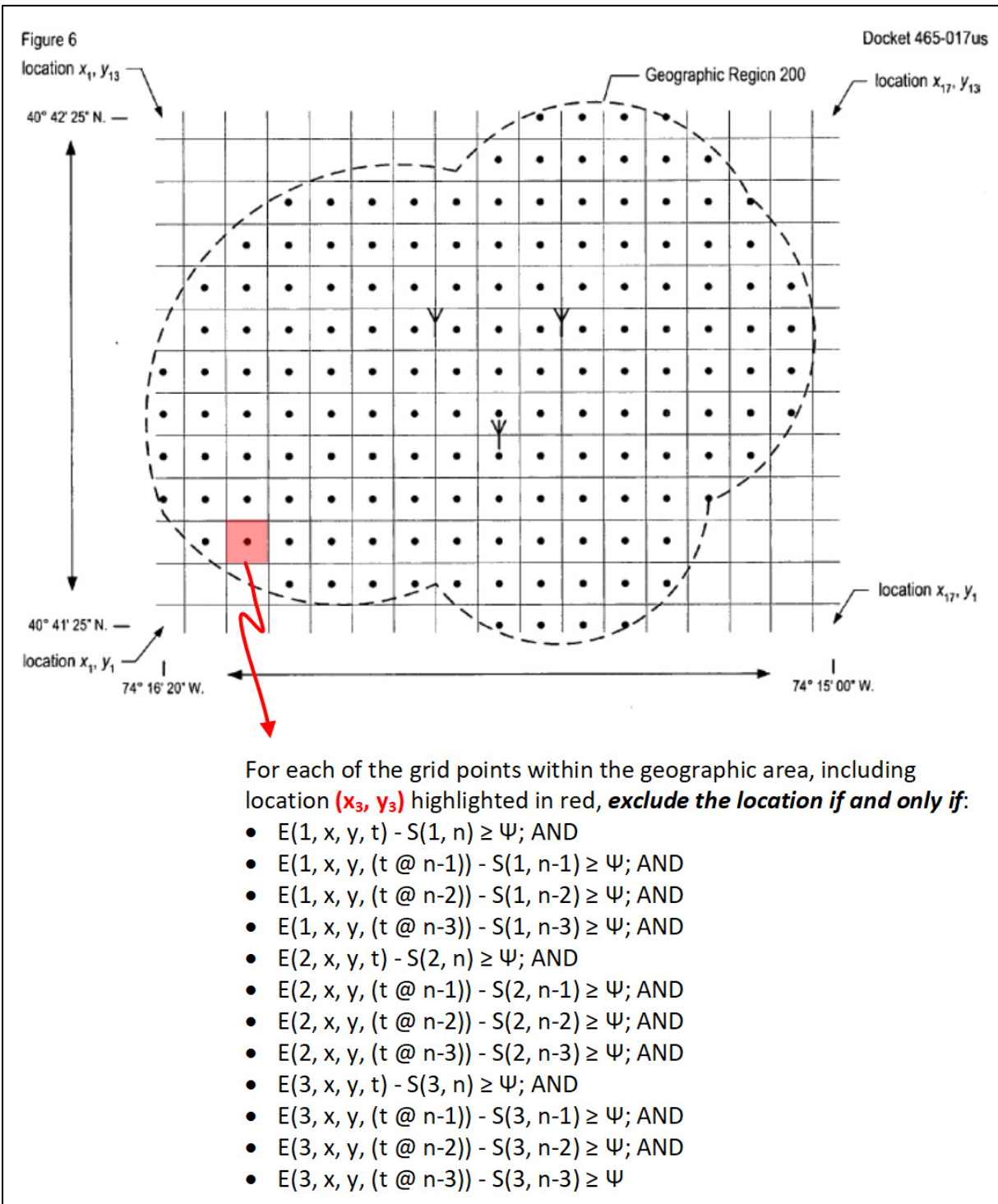
As described in Section V.A.1, *supra*, at task 405, location system 212 calibrates the reported signal-strength measurements in the SSMRs based on the “calibration function for the make and model of wireless terminal 201,” to “correct—or compensate for—the signal strength measurement errors made by wireless terminal 201.” *Id.*, [0097]; EX1003, ¶[85]. In other words, the received tuple of reported signal-strength measurements $\{R(1,n), R(2,n), R(3,n)\}$ from the

wireless terminal 201 becomes a tuple of calibrated signal-strength measurements $\{S(1,n), S(2,n), S(3,n)\}$, which is a function of $\{R(1,n), R(2,n), R(3,n)\}$ and the values in the calibration database created in step 402 for the make and model of wireless terminal 201. *See* EX1004, [0097], [0168]-[0169]; EX1003, ¶[85]. A POSITA would have understood or at least found it obvious that an evaluation of calibrated signal-strength measurements $\{S(1,n), S(2,n), S(3,n)\}$ is an evaluation of the network measurement report, because the calibrated signal-strength measurements $\{S(1,n), S(2,n), S(3,n)\}$ are a direct function of the reported signal-strength measurements $\{R(1,n), R(2,n), R(3,n)\}$ contained in the network measurement report received from wireless terminal 201. *See id.*

In order to evaluate the calibrated signal-strength measurements $\{S(1,n), S(2,n), S(3,n)\}$ and estimate the location of the wireless terminal 201, Bhattacharya describes an initial step (subtask 1701) in which the calibrated signal-strength measurements $\{S(1,n), S(2,n), S(3,n)\}$ are compared to the expected signal-strength values $\{E(1,x,y,t), E(2,x,y,t), \text{ and } E(3,x,y,t)\}$ associated with each of the grid points within geographic region 200. EX1004, [0171]-[0178]; EX1003, ¶[86]. A POSITA would have understood or at least found it obvious that these comparisons between the calibrated signal-strength measurements and the expected signal-strength values is an evaluation of “at least one network measurement report with each of said sets of grid points as a function of select

ones of said characterizing parameters,” as claimed. EX1003, ¶[86].

Specifically, at subtask 1701, processor 301 (of location system 212) uses “search area reduction” to “reduce the number of candidate locations that must be processed” by excluding candidates with a probability “calculated to be very close to zero.” EX1004, [0173]. The reduction is dictated by Equation 6, which a POSITA would have understood to be a direct comparison of a given received calibrated signal tuple (e.g., $\{S(1, n), S(2, n), S(3, n)\}$), as well as a discrete number Ω of the previously received calibrated signal tuples, against each of the expected signal tuples in the entire geographic region 200. *See* EX1004, [0173]-[0174]; EX1003, ¶[87]. If the difference between all Ω of the recently received calibrated signal tuples and the expected signal value E for a given location (x, y) is greater than a threshold value Ψ , then it is assumed that the probability that the mobile terminal is at location (x, y) is very low. *Id.* An example of this calculation is illustrated below, where Ω (i.e., the number of previously received signal strength reports used in this calculation) is assumed to be 3 for the sake of simplicity. EX1003, ¶[87].



Annotation of EX1004, FIG. 6 Illustrating Subtask 1701

In other words, a POSITA would have understood or at least found it

obvious that Equation 6, and specifically the portion where processor 301 evaluates whether $E(i,x,y,t)-S(i,j) \geq \Psi$ for each of the “152 candidate locations” that are contained in geographic area 200, is “evaluating said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing parameters,” as recited in [1d]. See EX1004, [0107], [0172]-[0174]; EX1003, ¶[88]. Here, the one network measurement report is represented by the set of calibrated signal-strength measurements $S(i,j)$, each of said sets of grid points is represented by the expected signal value $E(i,x,y,t)$ for each of the 152 candidate locations in the geographic region 200, the function is whether $E(i,x,y,t)-S(i,j) \geq \Psi$, and the select ones of said characterizing parameters are the signal strength values. EX1003, ¶[88].

[1e]

Bhattacharya describes or at least renders obvious [1e]. EX1003, ¶¶[89]-[90]. As described above with respect to [1d], at subtask 1701, processor 301 (of location system 212) uses “search area reduction” to “reduce the number of candidate locations that must be processed” by excluding candidates with a probability “calculated to be very close to zero.” EX1004, [0173]. “In essence, the test excludes a candidate location only when the calibrated signal-strength measurements have been substantially different from the expected signal strengths at that location for the last Ω measurements.” EX1004, [0174]. Thus, where the

expected signal strengths at least some of the locations are substantially different from the calibrated signal-strength measurements, the processor 301 excludes the location from use in subtasks 1702-1705. *See* EX1004, [0172]-[0173], [0184]-[0185]; EX1003, ¶[89]. For example, “[a]t the end of subtask 1703, processor 301 will have generated $m-1$ expected signal-strength differentials, $\Delta E(1, x, y, t)$ through $\Delta E(m-1, x, y, t)$, for all of the candidate locations **not excluded in subtask 1701**.” EX1004, [0188].

Accordingly, subtask 1701 “select[s] a set of grid points as a function of a predetermined criteria,” as claimed. EX1003, ¶[90]. Here, the function of a predetermined criteria is whether $E(i, x, y, t) - S(i, j) \geq \Psi$, and the set of grid points are the list of candidate locations not excluded in subtask 1701. *Id.*

[1f]

Bhattacharya describes or at least renders obvious [1e]. EX1003, ¶¶[91]-[94]. In general, Bhattacharya’s subtasks 1702 through 1706 “determin[e] the location of a mobile device in said geographic region as a function of said selected set of grid points,” as claimed. EX1003, ¶[91].

As described in Section V.A.1, *supra*, once processor 301 reduces the number of candidate locations in subtask 1701, it begins the subtasks related to generating the probability that the received signals are associated with each of the remaining candidate locations within the geographic area. *See generally* EX1004,

[0179]-[0207], EX1003, ¶[92]. However, unlike in subtask 1701, the processor 301 does not directly compare the received calibrated signal tuple S (e.g., $\{S(1, n), S(2, n), S(3, n)\}$) with the expected signal tuples E (e.g., $\{E(1, x, y, t), E(2, x, y, t), E(3, x, y, t)\}$) for each of the remaining candidate locations. *See* EX1004, [0179]-[0189], [0195], EX1003, ¶[92]. Instead, in subtasks 1702 and 1703, the processor 301 converts the received calibrated signal tuple S and the expected signal tuples E for each of the candidate locations into a set of differentials ΔN and ΔE that are comparisons of adjust signals within each tuple. EX1004, [0179]-[0188]; EX1003, ¶[92].

Bhattacharya explains that the purpose of generating and then comparing these signal-strength differentials ΔN and ΔE , as opposed to directly comparing the received calibrated signal tuple S and the expected signal tuples E , is that “various factors including the condition of the wireless terminal’s antenna, the state of its battery, and whether the terminal is inside a vehicle” can affect the reported signals for a wireless terminal, even when it is the same make and model and at the same location. *See* EX1004, [0021]-[0023]; EX1003, ¶[93]. By comparing the signal-strength differentials ΔN and ΔE generated in subtasks 1702 and 1703, Bhattacharya teaches that these biases owing to the state of the wireless terminal can be ameliorated. *See id.*

Next, Bhattacharya describes that, at “subtask 1704, processor 301 compares

the m-1 signal-strength measurement differentials, $\Delta N(1,n)$ through $\Delta N(m-1,n)$, to the m-1 expected signal-strength differentials, $\Delta E(1,x,y,t)$ through $\Delta E(m-1,x,y,t)$, for each [remaining candidate] location to generate a probability distribution that indicates the goodness of fit between the signal-strength measurement differentials, $\Delta N(1,n)$ through $\Delta N(m-1,n)$, and the expected signal-strength differentials, $\Delta E(1,x,y,t)$ through $\Delta E(m-1,x,y,t)$, at each location.” EX1004, [0190]. To accomplish this, the processor 301 generates a set of Euclidean norms between the various sets of differentials, which are subsequently turned into un-normalized and then normalized probabilities of whether the wireless terminal 201 is at each of the remaining candidate locations. *See* EX1004, [0191]-[0193]; EX1003, ¶[94].

Claim 7 - [7]

Bhattacharya and Yost render obvious [7]. EX1003, ¶¶[95]-[97]. As described with respect to [1a], Bhattacharya describes that the “expected signal-strength functions $E(1,x,y,t)$, $E(2,x,y,t)$, and $E(3,x,y,t)$ are generated based on a combination of: (i) a plurality of theoretical radio-frequency propagation models, and (ii) a plurality of empirical signal-strength measurements.” EX1004, [0115]-[0117]. Bhattacharya does not specify of otherwise limit the manner in which the plurality of empirical signal-strength measurements are taken at the various locations. *See generally* EX1004, [0112]-[0123]; EX1003, ¶[95]. As further described with respect to [1a], it was well-known to POSITAs as of the Critical

Date that at least one method of collecting the empirical measurements described by Bhattacharya would have been to transport testing devices around the geographic region 200 and measure the signal strength for each of the three signals received from the three base stations (202-1, 202-2, and 202-3) and the geographic location of the testing device (e.g., using a GPS receiver connected to the testing device) in order to determine the (x,y) associated with each of the three signals. *See, e.g.*, EX1008, 5:12-27, 5:50-60, 7:6-21; EX1003, ¶[96].

Because the data returned by the testing devices would need to be in a similar format as the reported signal-strength measurements $\{R(1,n), R(2,n), R(3,n)\}$ contained in the Signal-Strength Measurement Report (i.e., Network Measurement Report) from wireless terminal 201 (*compare* EX1004, [0086] to EX1004, [0091]-[0094]), a POSITA would have recognized or at least found it obvious that the empirical measurements taken by the testing device would have also been in the form of a Signal-Strength Measurement Report (i.e., Network Measurement Report). EX1003, ¶[97]. Indeed, it was well known at the Critical Date that the testing device used to take the empirical measurements would have themselves been wireless terminals like wireless terminal 201. EX1003, ¶[97]. A POSITA would have been motivated to utilize a wireless terminals like wireless terminal 201 as the testing devices to collect empirical measurements, because it

would have obviated the need to utilize specialized testing equipment. EX1003, ¶[97].

Claim 9 - [9]

Bhattacharya and Yost describe and render obvious [9]. EX1003, ¶¶[98]-[99]. As described with respect to [1a], Bhattacharya describes that the empirical measurements (i.e., the claimed calibration data) has one or more characterizing parameters. EX1003, ¶[98]. For example, Bhattacharya describes that the empirical measurements may include “signal strength measurements” at a given location. EX1004, [0115]-[0117]; EX1003, ¶[98]. More specifically:

Signal 1 is the control channel broadcast by base station 202-1 and its expected signal strength at location x,y at time t is represented by the function $E(1,x,y,t)$. Signal 2 is the overhead control channel broadcast by base station 202-2 and its expected signal strength at location x,y at time t is represented by the function $E(2,x,y,t)$. Signal 3 is the overhead control channel broadcast by base station 202-2 and its expected signal strength at location x,y at time t is represented by the function $E(3,x,y,t)$. For a given x,y location and time, these three functions together yield a 3-tuple of expected signal strengths designated as $\{E(1), E(2), E(3)\}$.

EX1004, [0086].

In other words, at least one “characterizing parameter” of the empirical measurement is the signal strength of overhead control channel broadcast signals

received from each of the surrounding base stations. *See* EX1004, [0115]-[0117]; EX1008, 7:6-21; EX1003, ¶[99]. Thus, at least one of the characterizing parameters is a “signal strength for a signal transmitted by a transmitter having a known location as received by a receiver at said grid point,” as claimed. EX1003, ¶[99].

Claim 32

[32pre]

To the extent the preamble is limiting (which Petitioner does not concede), Bhattacharya describes [32pre]. EX1003, ¶¶[100]-[101]. Bhattacharya describes that its “invention relates to telecommunications in general, and, more particularly, to a technique for estimating the location of a wireless terminal.” EX1004, [0001]. More specifically, Bhattacharya’s technique “enables the estimation of the location of a wireless terminal without the addition of hardware to either the wireless terminal or to the telecommunication system’s base stations.” EX1004, [0013].

“Location system 212 is a data processing system that is capable of estimating the location of wireless terminal 201.” EX1004, [0059]. “Location system 212 comprises: processor 301, memory 302, receiver 303, and transmitter 304” EX1004, [0064]. “Processor 301 is a general-purpose processor as is well-known in the art that is capable of executing the operating system and user programs in memory 302” EX1004, [0065]. The user programs perform the

tasks described with respect to FIG. 4. *Id.* “FIG. 4 depicts a broad overview of the salient tasks performed by the illustrative embodiment in estimating the location of wireless terminal 201 in geographic region 200.” EX1004, [0030]. Thus, processor 301 of location system 212 estimates the location of wireless terminal 201 in geographic region 200 by performing the tasks illustrated in FIG. 4. *Id.*; EX1003, ¶[101].

[32a]

Bhattacharya describes [32a]. EX1003, ¶[102]. Bhattacharya describes that “[l]ocation system 212 comprises: processor 301, memory 302, receiver 303, and transmitter 304, which are interconnected as shown” in FIG. 2. EX1004, [0064]. “Processor 301 is a general-purpose processor as is well-known in the art that is capable of executing the operating system and user programs in memory 302, and of populating, amending, accessing, and generally managing the Expected Signal-Strength Database and the Signal-Strength Corrections Database in memory 302.” EX1004, [0065].

[32b]

Limitation [32b] is substantially similar to limitation [1a], so limitation [32b] is either disclosed by or rendered obvious by Bhattacharya and Yost for at least similar reasons as limitation [1a]. EX1003, ¶[103]. Furthermore, as noted with respect to [32pre], “Location system 212 comprises: processor 301, memory

302, receiver 303, and transmitter 304” EX1004, [0064]. “Processor 301 is a general-purpose processor as is well-known in the art that is capable of executing the operating system and user programs in memory 302” EX1004, [0065]. “The user programs perform the tasks described below and with respect to FIGS. 4 through 18.” EX1004, [0065]. Thus, the processor 301 of locations system 212 performs the various functions described with respect to limitation [1a]. EX1003, ¶[103].

[32c]

Limitation [32c] is substantially similar to limitation [1b], so limitation [32c] is disclosed and rendered obvious by Bhattacharya and Yost for at least similar reasons as limitation [1b]. EX1003, ¶[104]. Furthermore, for the reasons explained with respect to [32b], the processor 301 of locations system 212 performs the various functions described with respect to limitation [1b]. EX1003, ¶[104].

[32d]

Limitation [32d] is substantially similar to limitation [1c], so limitation [32d] is disclosed and rendered obvious by Bhattacharya for at least similar reasons as limitation [1c]. EX1003, ¶[105]. Furthermore, for the reasons explained with respect to [32b], the processor 301 of locations system 212

performs the various functions described with respect to limitation [1c]. EX1003, ¶[105].

[32e]

Limitation [32e] is substantially similar to limitation [1d], so limitation [32e] is disclosed and rendered obvious by Bhattacharya for at least similar reasons as limitation [1d]. EX1003, ¶[106]. Furthermore, for the reasons explained with respect to [32b], the processor 301 of locations system 212 performs the various functions described with respect to limitation [1d]. EX1003, ¶[106].

[32f]

Limitation [32f] is substantially similar to limitation [1d], so limitation [32f] is disclosed and rendered obvious by Bhattacharya for at least similar reasons as limitation [1d]. EX1003, ¶[107]. Furthermore, for the reasons explained with respect to [32b], the processor 301 of locations system 212 performs the various functions described with respect to limitation [1d]. EX1003, ¶[107].

[32g]

Limitation [32g] is substantially similar to limitation [1f], so limitation [32g] is disclosed and rendered obvious by Bhattacharya for at least similar reasons as limitation [1f]. EX1003, ¶[108]. Furthermore, for the reasons explained with respect to [32b], the processor 301 of locations system 212 performs the various functions described with respect to limitation [1f]. EX1003, ¶[108].

Claim 38 - [38]

Claim 38 is substantially similar to claim 7, so claim 38 is disclosed and rendered obvious by Bhattacharya and Yost for at least similar reasons as claim 7. EX1003, ¶[109].

Claim 40 - [40]

Claim 40 is substantially similar to claim 9, so claim 40 is disclosed and rendered obvious by Bhattacharya and Yost for at least similar reasons as claim 9. EX1003, ¶[110].

VI. PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION

A. 35 U.S.C. §325(d)—*Advanced Bionics*

Advanced Bionics and the *Becton* factors strongly favor institution. [*Advanced Bionics LLC v. MED-EL Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (“*Advanced Bionics*”) (precedential); *Becton, Dickinson and Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15 2017) (“*Becton*”) (precedential). Yost was never identified by either the Applicant or the Examiner during original prosecution. While the patent that issued from Bhattacharya was cited in an IDS, that IDS was submitted on October 31, 2012—over a year after the only office action and nearly ten months after Applicant’s response that led to allowance. *See* EX1002, 32-33. The Examiner initialed this IDS with the Notice of Allowance that was issued a few months later,

but neither the Examiner nor the Applicant specifically discussed or otherwise highlighted the relevant teachings of Bhattacharya on the record during prosecution. Because this petition presents Bhattacharya in combination with a new reference that was never considered during original prosecution (Yost), Ground 1 presents prior art and arguments that have never been before the Office.

Accordingly, neither condition of the first prong of the *Advanced Bionics* framework is met, and there is no need to reach the second prong to resolve against discretionary denial under Section 325(d). *See, e.g., Oticon Medical AB et. al. v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 20 (PTAB Oct. 16, 2019) (precedential) (“There is new, noncumulative prior art asserted in the Petition...[f]or at least this reason, we determine not to exercise our discretion under § 325(d)”).

B. 35 U.S.C. §314(a)—*Fintiv*

Consistent with Congressional intent, the goals of *Fintiv*, and the interim guidance issued by Director Vidal on June 21, 2022 (“Director’s Guidance” or EX1022), Apple asks the Board to consider the challenges raised in this Petition. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Pap. 11, at 6 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). As explained in more detail below, the asserted claims in co-pending litigation have been invalidated and a notice of appeal has recently been filed by Geoscope. EX1023; EX1024. Even if Geoscope is successful in appeal, a decision of any remanded district court proceeding would not issue until

after the Final Written Decision (FWD). For this and other reasons noted below, a holistic analysis of the *Fintiv* factors favors institution.⁶

1. Factor 1

Factor 1 is neutral because neither Apple nor Geoscope have requested a stay in co-pending litigation, and the Board does “not attempt to predict” how an appeals or district court might adjudicate a future motion to stay. *Fintiv*, 12; IPR2019-01393, Pap. 24, at 7 (PTAB June 16, 2020) (“*Sand Revolution*”) (informative); IPR2020-01019, Pap. 12, at 14 (PTAB Dec. 1, 2020) (“*Sotera*”) (precedential).

2. Factor 2

The proceedings in the Eastern District of Virginia (*Geoscope Technologies PTE. LTD. v Apple Inc.*, 1:22-cv-01373, (E.D. VA.) (the “District Court”) have concluded and claims 1 and 32 of the ’753 patent were invalidated under 35 U.S.C. §101. EX1023, 20-23. Geoscope has filed an appeal. EX1024. No hearing date has been set and it is unclear if the case will ever be remanded to the District

⁶ Apart from Apple’s showing that *Fintiv* favors institution, the *Fintiv* framework should not be followed because it is legally invalid. The framework (1) exceeds the Director’s authority, (2) is arbitrary and capricious, and (3) was adopted without notice-and-comment rulemaking.

Court. Because there is no trial date in co-pending litigation, Factor 2 favors institution.

3. Factor 3

As noted above, the District Court proceedings have concluded because the asserted '753 patent claims were found invalid under 35 U.S.C. §101. EX1023, 20-23. In fact, the District Court proceedings never went to trial or even a pre-trial conference because they were concluded in response to the granting of Apple's Motion for Judgment on the Pleadings. EX1023, 23. Indeed, even the final claims and grounds to be asserted at trial were still to be determined.

Geoscope subsequently filed an appeal, and with the appeal process just beginning, significant investment is still needed in parallel litigation. EX1024.

In contrast, in this IPR proceeding, from the time Geoscope asserted five patents against Apple, Apple has diligently worked on addressing the validity of the asserted patents. For example, Apple hired counsel (Fish & Richardson), conducted prior art searches to identify relevant prior art and multiple invalidity grounds, reviewed Geoscope's infringement contentions, engaged an expert to assess the '753 patent/prior art references preparing an expert declaration, and drafted this petition along with several others to challenge the asserted patents.

In view of the significant investment still required in the parallel litigation proceedings and, in contrast, the amount of investment already made in this IPR

proceeding, factor 3 favors institution or at worst is neutral.

4. Factor 4

As noted above, the District Court held that claims 1 and 32 of the '753 patent were invalid under 35 U.S.C. §101. EX1023, 20-23. Because any appeal of the District Court holding would be limited to §101 issues and §101 grounds cannot be and are not raised in this IPR petition, there is no overlap of issues in this IPR proceeding and parallel litigation. Thus, factor 4 favors institution.

5. Factor 5

Apple's status as a defendant/appellee in parallel litigation proceedings is at worst neutral under *Fintiv* Factor 5. Indeed, the *Fintiv* decision "says nothing about situations in which the petitioner is the same as, or is related to, the district court defendant." *Cisco Systems, Inc. v. Ramot at Tel Aviv University Ltd.*, IPR2020-00122, Pap. 15, at 10 (Crumbley, dissenting); *Fintiv*, 13-14. At worst, where the parties are the same, Factor 5 is neutral. *Cisco Sys., Inc. v. Ramot at Tel Aviv Univ. Ltd.*, IPR2020-00122, Pap. 15, at *10 (May 15, 2020) (APJ Crumbley, dissenting).

6. Factor 6

Director Vidal has explained that "the PTAB will not deny institution...under *Fintiv*...when a petition presents compelling evidence of unpatentability...." Director's Guidance, 3-5, 9; *see also Fintiv*, 14-15.

The merits of this Petition are compelling. As demonstrated in the Petition with reference to Dr. Sundaresan’s testimony and additional evidence, institution would result in a finding of unpatentability of the Challenged Claims, which are obvious based on prior art references that materially differ from those considered by the Examiner during prosecution. *See generally* EX1003.

Even if the District Court Litigation may be relevant, the strength of the merits alone is enough to outweigh any inefficiencies born of parallel litigation. Director’s Guidance, 3-5, 9; *Fintiv*, 14-15 (“if the merits of a ground raised in the petition seem particularly strong...institution of a trial may serve...overall system efficiency and integrity”).

Accordingly, *Fintiv* Factor 6 strongly favors institution.

C. *General Plastic* Factors Favor Institution—§314(a)

The ’753 Patent is currently being challenged in instituted IPR2023-01212 filed by Google LLC. The instant petition is entirely distinct—it is being filed by an entirely separate party, and this petition uses completely different prior art than was used in Google’s earlier petition. For these reasons, the *General Plastic* factors favor institution. *General Plastic Industrial Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 16 (PTAB Sept. 6, 2017) (precedential as to section II.B.4.i).

1. Factors 1, 2, 4, and 5: Apple and Google Are Entirely Separate Entities

Apple and Google are separate companies sued separately by Patent Owner. The Apple and Google products Patent Owner accuses of infringing the '753 Patent are not related to one another. Moreover, Apple and Google did not cooperate in any way in preparing either the previously filed IPR2023-01212 or this petition. These facts are nearly opposite facts to those present in the Board's precedential *Valve* decision. *See Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11 at 9-10 (PTAB Apr. 2, 2019) (precedential).

Because the evidence does not show a significant relationship between Apple and Google, “*General Plastic* factors 1, 2, 4, and 5 weigh against discretionary denial.” *Volkswagen Group of America, Inc. v. Neo Wireless LLC*, IPR2022-01537, Paper 8 at 11 (PTAB May 5, 2023). Where, as here, “there is no indication of a significant relationship under *Valve* and factor 1 between Petitioner and the” prior petitioner, “Petitioner did not file a second petition following-on to a first petition under factors 2, 4, and 5.” *Id.* “In other words, this is not a case where we need to address concerns that Petitioner is ‘strategically stag[ing] [its] prior art and arguments in multiple petitions’ in order to refine its positions based on lessons learned from Petitioner’s filing of an earlier petition.” *Id.* (citing *General Plastic*, Paper 19 at 17; *Code200, UAB v. Bright Data, Ltd.*, IPR2022- 00861, Paper 18 at 5

(PTAB Aug. 23, 2022) (precedential)).

2. Factor 3: The Different Prior Art at Issue Between the Proceedings Ensures No Advantage Is Gained

Patent Owner filed its POPR in IPR2023-01212 on November 22, 2023. However, as noted above, the prior art references relied upon in IPR2023-01212 are entirely distinct from the prior art references that form the basis for this Petition. Thus, knowledge of the arguments raised in the POPR of IPR2023-01212 does not confer any advantage to Apple.

3. Factors 6 and 7: The Distinct Grounds and Lack of Significant Relationship Ensure the Board's Resources and Ability to Render a Decision Within the Statutory Timeframe Are Not Significantly Impacted

There are no common prior art references between this petition and IPR2023-01212. Moreover, because Apple and Google share no significant relationship, the rights of Apple to pursue this petition will not in any way be impacted by the outcome of IPR2023-01212. Thus, any Final Written Decision in IPR2023-01212 is unlikely to have a significant impact on the merits or conduct of an instituted IPR from this petition. And while the Board will expend resources necessary to hear this second petition, the expenditure of those resources is justified by Apple's independent and distinct basis under §314 to file an IPR petition and the fees that Apple is paying to have this petition heard on the merits.

Furthermore, it's entirely possible for Patent Owner to settle with Google and

seek termination of IPR2023-01212 at any time during its pendency, after Apple's statutory bar date. Apple's basis under §314 to have the Board consider the patentability of the '753 Patent should not be put in tension with and potentially curtailed by Patent Owner and Google's distinct right to settle their dispute outside of Apple's control.

VII. CONCLUSION

The instant Petition compellingly demonstrates the obviousness of the Challenged Claims. Accordingly, Apple respectfully requests institution.

VIII. PAYMENT OF FEES – 37 C.F.R. §42.103

Apple authorizes the Patent and Trademark Office to charge Deposit Account No. 06-1050 for the fee set in 37 C.F.R. §42.15(a) for this Petition and further authorizes payment for any additional fees to be charged to this Deposit Account.

IX. MANDATORY NOTICES—37 C.F.R §42.8(a)(1)

A. Real Party-In-Interest—37 C.F.R. §42.8(b)(1)

Petitioner, Apple Inc. is the real party-in-interest.

B. Related Matters—37 C.F.R. §42.8(b)(2)

Petitioner is not aware of any disclaimers or reexamination certificates for the '753 Patent. The '753 Patent is the subject of ongoing *inter partes* review petition IPR2023-01212 filed by Google LLC on August 9, 2023. The '753 Patent is also

the subject of litigation in the following district court proceedings:

- *Geoscope Technologies Pte. Ltd. v. Google LLC*, Appeal No. 24-1003
(C.A.F.C. Oct. 2, 2023)
- *Geoscope Technologies Pte. Ltd. v Apple Inc.*, Case No. 1-22-cv-01373
(E.D. VA.)
- *Geoscope Technologies Pte. Ltd. v Google LLC.*, Case No. 1-22-cv-01331 (E.D. VA.)

C. Lead And Back-Up Counsel—37 C.F.R. §42.8(b)(3)

Petitioner provides the following designation of counsel.

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D. Service Information

Please address all correspondence and service to the address listed above.

Petitioner consents to electronic service by email at IPR50095-0140IP1@fr.com.

Respectfully submitted,

Dated: December 6, 2023

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CERTIFICATION UNDER 37 C.F.R. §42.24

Under the provisions of 37 C.F.R. §42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter partes* Review totals 11,419 words, which is less than the 14,000 allowed under 37 C.F.R. §42.24.

Dated: December 6, 2023

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on December 6, 2023, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided via Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

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