

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner

v.

GEOSCOPE TECHNOLOGIES PTE. LTD.
Patent Owner

Case No. IPR2023-01212
Patent 8,406,753

**DECLARATION OF DAVID H. WILLIAMS IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,406,753**

GOOGLE EXHIBIT 1008
Google v. Geoscope

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Exhibit No.	Description
1001	U.S. Patent No. 8,406,753, issued on March 26, 2013 (“the ’753 Patent”)
1002	File History of U.S. Patent Application No. 12/026,480, filed on February 5, 2008 (“the ’480 Application”)
1003	U.S. Provisional Application No. 60/899,379, filed on February 5, 2007
1005	A. Agiwal <i>et al.</i> , “LOCATOR – Location Estimation System for Wireless LANs,” 2004
1006	U.S. Patent Publication No. 2003/0064735, published on April 3, 2003 to D. Spain <i>et al.</i> (“Spain”)
1007	Appendix D to Geoscope’s Preliminary Infringement Contentions dated April 7, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
1009	<i>Curriculum Vitae</i> of David Hilliard Williams
1012	Complaint dated November 22, 2022, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022 (“the Related Litigation”)
1014	U.S. Patent Publication No. 2005/0266855, published on December 1, 2005 to G. Zeng <i>et al.</i> (“Zeng”)
1015	U.S. Patent No. 7,167,714, issued on January 23, 2007 to R. Dressler and D. Spain, Jr. <i>et al.</i> (“Dressler”)
1016	Difference comparison between the text of the Specifications of the Dressler and Spain
1017	U.S. Patent No. 7,433,695, issued on October 7, 2008 to S. Gordon <i>et al.</i> (“Gordon”)

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Exhibit No.	Description
1018	U.S. Patent No. 7,561,104, issued on July 14, 2009 to M. Alles <i>et al.</i> (“the ’104 Patent”)
1019	File History of Reexamination Control No. 90/012,694 (“the ’694 Reexamination”)
1020	Difference comparison between the text of the Specifications of the Gordon and Spain
1021	U.S. Patent No. 7,460,505, issued on December 2, 2008 to D. Spain (“the ’505 Patent”)
1022	Difference comparison between the text of the Specifications of the ’505 Patent and Spain
1023	Plaintiff Geoscope Technologies PTE. LTD.’s Opening Claim Construction Brief, E.D. Va. Civil Action No. 1:22-cv-01373-MSN-JFA (Dkt. No. 75).
1024	Stipulation Regarding Agreed Upon Claim Constructions dated May 23, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1025	Google LLC’s Opening Claim Construction Brief dated May 26, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1028	Claim Construction Memorandum Opinion & Order dated July 19, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022

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I, David H. Williams, hereby state as follows:

I. INTRODUCTION

1. I have been retained by Google LLC (“Petitioner”) as an independent expert consultant in this *inter partes* review (“IPR”) proceeding before the United States Patent and Trademark Office (“PTO”).

2. I have been asked by Counsel for Petitioners (“Counsel”) to consider whether certain references teach or suggest the features recited in Claims 1, 7, 9, 32, 38, and 40 (“the Challenged Claims”) of U.S. Patent No. 8,406,753 (“the ’753 Patent”) (EX1001). My opinions and the bases for my opinions are set forth below.

3. I am being compensated at my ordinary and customary consulting rate for my work, which is \$485 per hour. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other financial interest in this proceeding.

II. BACKGROUND AND QUALIFICATIONS

4. All my opinions stated in this declaration are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in designing, developing, researching, and teaching the technology referenced in this declaration.

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5. I am over 18 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein. I understand that a copy of my current curriculum vitae, which details my education and professional and academic experience, is being submitted as EX1009. The following provides a brief overview of some of my experience that is relevant to the matters set forth in this declaration.

6. I have over 30 years of experience in wireless location services, including experience implementing Wireless 911 (E911) systems and designing, implementing, and managing numerous location-based service (LBS) applications such as family tracking and fleet and asset management. I am currently the President of the company E911-LBS Consulting, and I have been with the company since 2002. As the President of E911-LBS Consulting, I provide services across the entire wireless value chain, particularly with respect to technology and business strategic planning and product design and development associated with LBS, Global Positioning Satellite (GPS) systems, E911, Real-Time Location Systems (RTLS), Radio Frequency Identification (RFID), beacon, and other location determination and sensing technologies and services.

7. I have extensive expertise in all aspects of LBS delivery across the wireless location ecosystem including enabling network, map data, geospatial platform, chipset, data management, device, and location determination

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infrastructure and integration providers. I am an expert in all related aspects of LBS, including data privacy and security management.

8. For example, I managed the development and launch of several consumer-oriented LBS applications including mobile social networking, family tracking and local search for a major wireless carrier (AT&T). This work included the development of corporate-wide location data privacy policies and their systemic implementation for all LBS customers. My work in both data privacy and mobile social networking resulted in my co-inventing a patent in this field. I also have several other patents related to mobile location and associated applications and architectures.

9. I also have significant experience related to E911 systems. For example, in 2003-2004, I consulted with AT&T Wireless on their implementation of E911 systems. Specifically, I led the development of implementation and monitoring of systems in AT&T Wireless Western Region as part of their deployment of TDOA (Time Difference of Arrival) non-GPS E911 network location infrastructure to meet the wireless E911 location requirements mandated by the FCC. In 2004-2005, I worked with NAVTEQ, a key provider of LBS and E911 location map data, in developing their application developer ecosystem and website, providing developers with access to all of NAVTEQ's product and technical

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resources for developing location-related applications, including data products involving 911 GIS (Geographical Information Systems).

10. I have authored multiple books on wireless location, including:

- The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2005 and 2009 versions);
- The Definitive Guide to Wireless E911; and
- The Definitive Guide to Mobile Positioning and Location Management (coauthor).

11. I received a B.S. degree, in Electrical Engineering, from Purdue University in 1983. I received a MBA degree, in Information Systems Management, from The University of Texas at Austin in 1987.

III. INFORMATION CONSIDERED

12. In preparing this declaration, I considered all of the materials discussed herein, including, for example, the '753 Patent, the references cited by the '753 Patent, the prosecution histories of the '753 Patent and applications from which it derives (including the references cited therein), various background articles and materials referenced in this declaration, and the prior art references identified in this declaration. In addition, my opinions are further based on my education, training, experience, and knowledge in the relevant field.

IV. RELEVANT LEGAL STANDARDS

13. I am not an attorney and offer no legal opinions. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my analysis, as summarized below.

A. Claim Interpretation

14. I have been informed that during an *inter partes* review proceeding, claims are to be construed in light of the specification as would be read by a person of ordinary skill in the relevant art at the time the application was filed. I have been informed that claim terms are given their ordinary and customary meaning as would be understood by a person of ordinary skill in the relevant art in the context of the entire disclosure. A claim term, however, will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the claim term in the specification. In that case, the claim term will receive the definition set forth in the patent.

15. I have been informed that certain patent claim terms may be interpreted as “means-plus-function” claim terms. I have been informed that terminology is part of the U.S. Patent Law in 35 USC §112, paragraph 6 (pre-AIA) / 35 USC § 112(f) (post-AIA), which states the following: “An element in a claim for a combination may be expressed as a means or step for performing a specified function without the

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recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.”

B. Perspective of One of Ordinary Skill in the Art

16. I have been informed that a patent is to be understood from the perspective of a hypothetical “person of ordinary skill in the art” (“POSITA”). Such an individual is considered to possess normal skills and knowledge in a particular technical field (as opposed to being a genius). I have been informed that in considering what the claims of a patent require, what was known prior to that patent, what a prior art reference discloses, and whether an invention is obvious or not, one must use the perspective of such a POSITA.

C. Anticipation

17. I have been informed that a claim is not patentable if it is anticipated. I have been informed that anticipation of a claim requires that every element of a claim is disclosed expressly or inherently in a prior art reference, arranged as in the claim, when considered from the perspective of a person of ordinary skill in the relevant art. I have been informed that when the structure recited in a reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. I have been informed that extrinsic evidence may be used

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to explain but not expand the meaning of terms and phrases used in the reference relied upon as anticipatory of the claimed subject matter.

D. Obviousness

18. I have been informed that a patent claim is obvious under 35 U.S.C. § 103, and therefore invalid, if the claimed subject matter, as a whole, would have been obvious to a POSITA as of the priority date of the patent based on one or more prior art references and/or the knowledge of a POSITA.

19. I have been informed that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long- felt but unmet need, failure of others, copying by others, and skepticism of experts).

20. I have been informed that a prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. § 103. I have been informed that a reference may also be combined with the knowledge of a POSITA, and that this knowledge may be used to combine multiple references. I have been informed that a POSITA is presumed to know the relevant prior art. I have

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been informed that the obviousness analysis may take into account the inferences and creative steps that a POSITA would employ.

21. In determining whether a prior art reference would have been combined with other prior art or other information known to a POSITA, I have been informed that the following principles may be considered:

- whether the references to be combined involve non-analogous art;
- whether the references to be combined are in different fields of endeavor than the alleged invention in the Patent;
- whether the references to be combined are reasonably pertinent to the problems to which the inventions of the Patent are directed;
- whether the combination is of familiar elements according to known methods that yields predictable results;
- whether a combination involves the substitution of one known element for another that yields predictable results;
- whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results;
- whether the combination is “obvious to try”;
- whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other

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market forces, where the variations are predictable to a POSITA;

- whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- whether the combination requires modifications that render the prior art unsatisfactory for its intended use;
- whether the combination requires modifications that change the principle of operation of the reference;
- whether the combination is reasonably expected to be a success; and
- whether the combination possesses the requisite degree of predictability at the time the invention was made.

22. I have been informed that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I have been informed, however, that a teaching, suggestion, or motivation to combine is not required.

V. SUMMARY OF OPINIONS

23. It is my opinion that Claims 1, 7, 9, 32, 38, and 40 of the '753 Patent are unpatentable under 35 U.S.C. §§102 (Anticipated) or 103 (Obvious) on the following ground:

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Ground	Reference(s)	Basis	Claims
1	U.S. Patent Publication No. 2003/0064735 (“Spain”) (EX1006), as evidenced by: Agiwal (EX1005)	§§102/103	1, 7, 9, 32, 38, and 40

VI. TECHNOLOGY BACKGROUND

24. The ’753 Patent describes determining location of a mobile device whose location is unknown using “network measurement reports” received from the mobile device and containing “calibration data” (such as signal strength data of wireless signals transmitted from various transmitters) to perform Grid-Based Pattern Matching for a geographic region. *See e.g.*, EX1001, Abs.. The ’753 Patent explains that such “network measurement reports” are “known in the art” and the “calibration data” within such a report may include, for example, “signal strengths observed for signals transmitted by a set of transmitters of known location within or in proximity to the region R.” EX1001, 9:53-63.

25. “Network measurement reports” are used in the ’753 Patent’s system to contain “calibration data” obtained at specific “calibration points” as known points in a geographic region. *See e.g.*, EX1001, 9:53-59; 10:23-28. Once stored, analyzed and associated with generated “grid points,” the originally observed “calibration data” is evaluated against similar data transmitted from a mobile device

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–also in a “Network Measurement Report” – and observed during location determination. *See e.g.*, Abs.; 2:36-39.

26. The '753 Patent discloses the system is “useful in certain situations [but] there is a need 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 (emphasis added). The problem identified in the '753 Patent is a significant volume of data that needs to be searched during geolocation, and the need to perform such searching efficiently.

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27. The '753 Patent's proffered solution is to: (1) provide “calibration data” for each of one or more “calibration points” in a geographic region, as known in the art, (2) generate one or more sets of “grid points” for the “calibration data”, (3) evaluate “network measurement report” “calibration data” received from a mobile device at an unknown location with the generated “sets of grid points”, (4) to select “a set of grid points” using a predetermined criteria, and lastly (5) to determine the mobile device location as a function of the selected “set of grid points” – all with a grid-based pattern matching system. *See e.g.*, EX1001, 2:26-50; Claim 1.

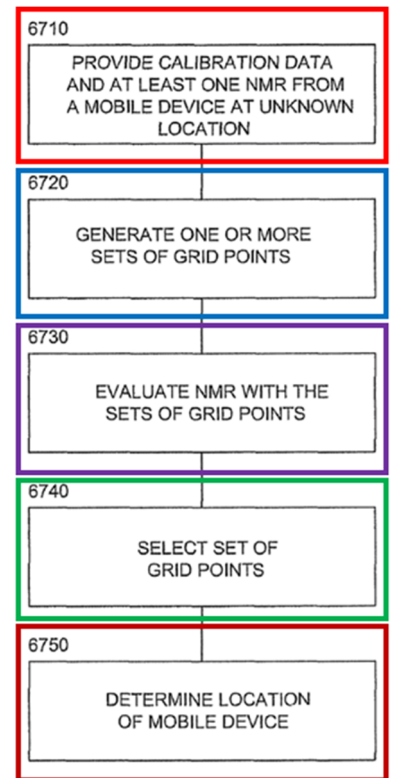


FIG. 67

28. The '753 Patent states: “The performance of a *grid-based pattern matching system such as that disclosed herein* is typically dependent on stored received signal level measurements that accurately reflect the levels that are likely to be reported by the mobile device to be located.” EX1001, 2:39-50 (emphasis added).

29. The '753 Patent solution relies on the alleged novelty of “generating one or more sets of grid points” for observed calibration data. *See below*, ¶¶39-43

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(Points 1 and 2); EX1002, p.50 (“no grid points are generated within any geographic region in Zeng that is associated with a particular set or sets of calibration data”); *see also* EX1012, ¶¶60-61.

30. It is my understanding that Patent Owner (“Owner”) has advanced an interpretation that involves generating a random grid point such as a non-uniform grid point (NUG). Owner characterizes this as “fill[ing] in the map between cell towers.” EX1012, ¶61.

31. Geolocation techniques involving such generated “sets of grid points” were well known at the time of the ’753 Patent, as shown in the Ground of invalidity discussed below.

VII. THE CHALLENGED ’753 Patent

32. The ’753 Patent contains 57 claims. I have been asked to opine on the validity of Claims 1, 7, 9, 32, 38, and 40.

VIII. THE ’753 PATENT PROSECUTION HISTORY

33. I have reviewed the file history of the ’753 Patent. The USPTO rejected all pending claims except 11, 18-28, and 49-54 over U.S. Pat. Pub. No.

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2005/0266855 (“Zeng”)¹ alone or in combination with other references for certain dependent claims. EX1002, pp. 50-57.² The rejection focused on the Zeng reference’s “radio map”. EX1002, p. 50. Zeng’s radio map is a data structure of signal strength value entries for “seen” and specific reference devices (e.g. WiFi access points) at calibration points (e.g. specific geographic locations). *See* EX1014, ¶108 and Fig. 1. Zeng discloses reliance on a traditional radio map. *Id.*

34. For the claimed calibration data for calibration points,³ the rejection focused on Zeng’s multiple measurements of signal strength data for reference devices (e.g. WiFi access points). EX1002, p. 50. The Examiner understood this to be raw signal strength data, where multiple measurements are obtained at each calibration point (e.g. a specific geographic location)—as explained in Zeng. EX1002, pp. 50 (“survey at each calibration point”) (emphasis added); EX1014 at ¶108 (“The signal strength from each reference device 104 heard at that calibration

¹ The Examiner mistakenly referred to U.S. Patent No. 6,564,065 to Chang when intending to refer to Zeng.

² No Amendments were entered after filing, and the rejected claims match the issued claims.

³ (limitation (a) of claim 1 and (i) of claim 32)

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point can be recorded. *This process can be repeated several times* and the signal strength values are typically averaged.”) (emphasis added).

35. For generating one or more sets of grid points,⁴ the rejection focused on the *averaging* of obtained signal strengths at each calibration point. EX1002, p.50.

36. For the claimed selection of a set of grid points,⁵ the rejection focused on Zeng’s on-the-fly/at runtime filtering of its radio map to select only those calibration points that include a signal strength value for a specific set of reference devices. EX1002, p. 51. This runtime filtering is performed on-the-fly during Zeng’s location determination to select only those radio map calibration points where the same reference devices were “seen” as in the current scan (*i.e.*, the live measurement taken for location determination). *Id.* (“calibration points that contain exactly the same reference devices that were seen in the current scan”); *see also* EX1014 at ¶37 (forming sets each time a location determination is performed).

37. The Examiner applied U.S. Pat. No. 7,167,714 (“Dressler”) (EX1015) to pending claims 13 and 44. The Examiner focused on those claims relating to

⁴ (limitation (b) of claim 1 and (ii) of claim 32)

⁵ (limitation (e) of claim 1 and (iii) of claim 32)

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“omitting a first location estimate having an error greater than a predetermined threshold.” EX1002, p. 56. Dressler is related to Spain through a common application, but Spain has additional relevant disclosure. *See* EX1006 (discussing continuity chain, including priority to 09/158,296 to which Dressler also claims priority); EX1016 (difference comparison). The Examiner’s rejection focused on aspects of Dressler that do not form any part of the Ground of invalidity discussed below.

38. Applicant’s Response made three salient points to distinguish Zeng.

39. **Point 1:** Concerning the claimed grid points and generation of one or more sets of grid points, Applicant stated 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; the Office has not made this distinction in its rejection and has thus misread the reference of record.” EX1002, pp. 42-43 (emphasis in original).

40. This comment by Applicant confirms what Zeng makes clear—Zeng’s signal strengths are averaged at a known calibration point where that data was obtained, and then inserted into Zeng’s radio map. *See e.g.*, EX1014 at ¶37. No new points are generated in Zeng. EX1002, p. 56. No set of calibration points is generated

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in advance (*see. e.g.*, EX1014 at ¶37). The Ground of invalidity explained below specifically teaches generation and selection of grid points.

41. **Point 2:** Applicant explained that Zeng’s filtering operation does not teach selection of “grid points” because there are no such grid points (EX1002 at 42) and that “no sets of grid points (or even Zeng’s calibration points) are ever selected...”). EX1002 at 43. The Ground of invalidity explained below specifically teaches generation and selection of grid points.

42. **Point 3:** Applicant argued that the Examiner’s application of Zeng was deficient because mere receipt of signal strengths from a mobile device was an inherency argument for a “network measurement report.” EX1002 at 42. The Ground of invalidity explained below expressly discloses network measurement reports containing signal strengths.

43. A Notice of Allowance was mailed referencing Applicant’s response. EX1002 at 13.

IX. LEVEL OF ORDINARY SKILL IN THE ART

44. A POSITA would have been someone knowledgeable in wireless networks, cellular radio systems, mobile communication devices and radio navigation systems. That person would have at least a bachelor’s degree in electrical engineering, with a background in radio frequency communications and/or

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navigation system technology as well as approximately two years of industry experience working on radio communication and/or navigation systems.

X. PRIORITY DATE

45. I have been informed that the “priority date” or “earliest effective filing date” of a patent is the date on which it is filed, or the date on which an earlier-filed U.S. or international patent application was filed if the patentee claims the benefit of priority to that earlier-filed U.S. or international patent application. The ’753 Patent issued from U.S. Patent Application No. 12/026,480, filed February 5, 2008, claiming priority to U.S. Provisional Application No. 60/899,379 (EX1003), filed February 5, 2007. For purposes of this declaration, I have assumed that the ’753 Patent is entitled to a priority date of February 5, 2007, and I have not evaluated or formed an opinion on whether the claims of the ’753 Patent are actually entitled to that date.

XI. CLAIM CONSTRUCTION

46. For purposes of my analysis in this IPR proceeding, I have been informed that terms that appear in the claims of the ’753 Patent should be interpreted according to their plain and ordinary meaning under the *Phillips* standard. In determining the ordinary and customary meaning, I have been informed that the words of a claim are first given their plain meaning that those words would have had to a POSITA at the time of the alleged invention. I also have been informed that the

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claims, specification, and file history may be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. I have been informed that even treatises and dictionaries may be used under limited circumstances to determine the meaning attributed by a POSITA to a claim term at the time of filing.

47. I also understand that, for terms that evoke a means plus function construction, “the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function.” 37 C.F.R. §42.104(b)(3). I understand from counsel that construing a means-plus-function claim term is a two-step process that includes (1) identifying the claimed function and (2) then determining what structure, if any, disclosed in the specification corresponds to the claimed function.

48. I have reviewed the ’753 Patent and its prosecution history as well as additional documents to construe the claims for performing my validity analysis. It is my understanding that some terms of the ’753 Patent are in dispute and a Markman Order (EX1028) issued in the Related Litigation addressing those disputes. Below is a summary of claim constructions I have made for purposes of evaluating the Challenged Claims of the ’753 Patent.

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A. “calibration data”

50. I have construed the phrase “calibration data” as modified or unmodified network measurement data associated with a defined geographic location.

51. This construction is consistent with the Markman Order. *See* EX1028, p.8.

B. “calibration points”

52. I am aware that in Related Litigation, Petitioner and Owner have stipulated that “calibration points” should be construed as “geographic points with which calibration data is associated.” EX1024, p.1.

53. The Ground of invalidity discussed below applies this construction.

C. “grid point”

54. I have construed the phrase “grid point” as a point associated with representative calibration data for an area.

55. This construction is consistent with the Markman Order. *See* EX1028, p.20.

D. “network measurement report”

56. I understand that Owner may argue that the claimed “network measurement report” must have a defined data structure. *See* ¶43 (Point 3). The Ground of invalidity discussed below addresses any such data structure requirement.

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57. I have construed the phrase “network measurement report” as a report used in cellular networks which provides the results of a measurement from a mobile device on one or more cells.

58. This construction is consistent with the Markman Order. *See* EX1028, p.18.

E. The steps of “providing . . .,” “generating . . .,” “evaluating . . .,” and “selecting . . .” Occur in This Stated Order.

59. I am aware that in Related Litigation, Petitioner and Owner stipulate that the order of “providing . . .,” “generating . . .,” “evaluating . . .,” and “selecting . . .” steps of claim 1 of the ’753 Patent is construed as “providing has to occur before generating, and generating has to occur before both evaluating and selecting.” EX1024, p.2. The Ground of invalidity discussed below addresses this ordering of the claimed steps.

XII. OVERVIEW OF THE PRIOR ART REFERENCES

A. Spain (EX1006)

60. Spain describes locating a mobile device using radio frequency (RF) fingerprints based on measured signal strengths. EX1006, Abs. ll. 1-3. The RF fingerprints in Spain are stored in a database. *Id.*, EX1006, [0047]:2-5; [0048]; Fig. 3, Step 307; Fig. 9/10 (and associated disclosure at [0098]-[0099]). The RF Fingerprint database is used for geolocating a mobile device at an unknown location

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based on live network measurements reported from the mobile device. *Id.* at Abs.; [0048].

61. Spain discloses an initial approximate location-based search using the identity of a serving cell transmitted from the mobile device. EX1006, [0066]; [0082]; Fig. 12, Step 1204; Fig. 15. To support this approximate location-based search, Spain provides disclosure concerning storing the “possible serving cell site(s)” (*i.e.*, the identity of a serving cell) with each fingerprint entry. *See* [0070]-[0072]. Using its initial approximate location-based search “the number of possible locations [may be reduced] by a factor of one thousand or more.” *Id.* at [0066]. Spain also discloses generating sets of grid points wherein each set includes newly interpolated grid points. *Id.*, [0101]:1-4; [0054]:1-3; [0055]:1-6; [0055]:6-9.

62. In Spain, a set of grid points is selected based on signal strength “closeness,” and a location is interpolated as a function of those selected grid points. EX1006, [0047]:11-15.

63. Spain discloses the ’753 Patent’s Figure 67 as demonstrated by an annotated Figure 3 of Spain wherein a common color scheme is applied. The annotation version of Figure 3 below includes added steps that occur before location determination with citations and includes the specific way Spain teaches ultimate location determination in connection with Step 309.

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'753 Patent

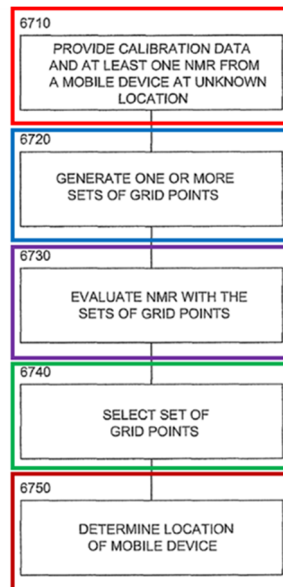
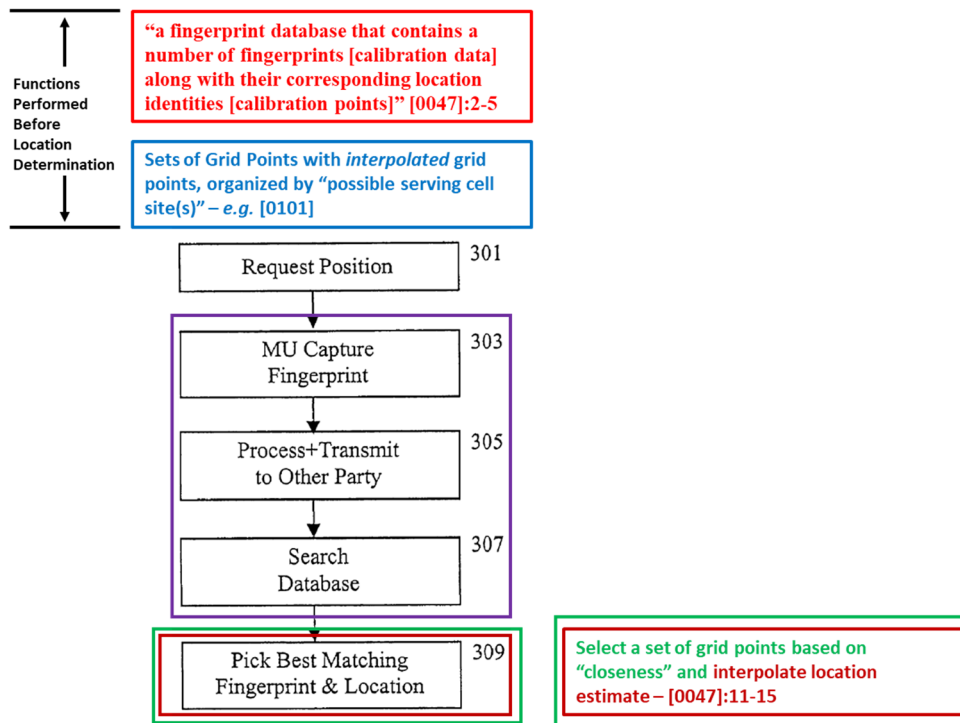


FIG. 67

Spain



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B. Agiwal (EX1005)

64. Agiwal describes locating a mobile device using radio frequency (RF) fingerprints. *See* Agiwal, p.102, Abs. ll. 1-9. Agiwal uses an RF fingerprint database, and comparison of live measurements to data in that database during geolocation. *Id.*, p. 103, Section 3.1.

65. Like Spain, Agiwal discloses an initial approximate location-based search of its database using live measurement data transmitted from a mobile device. Agiwal, p.104, Section 3.1.2. Following its initial approximate location-based search, Agiwal first identifies a set of grid points using signal strength based on “closeness” through a k-best search, and then generates a location estimation as a function of those grid points. *Id.* p.105, *Id.*, at.105, Section 3.2.1 (k-best search); pp. 105-106, Section 3.2.2 (clustering of k-best) and Section 3.2.3/3.2.4 (location estimation following k-best clustering).

**XIII. DETAILED EXPLANATION OF THE UNPATENTABILITY
GROUNDS**

66. In my opinion, the Challenged Claims are unpatentable over the prior art.

67. The following sections provide reference to where the elements of Claims 1, 7, 9, 32, 38, and 40 are found in the prior art.

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68. As an overview, Spain teaches using any available technique to reduce search complexity of a database (*see e.g.*, EX1006, [0066]; [0067]; [0082]-[0084]; [0096]; [0099]:1-4). Spain specifically mentions limiting the search by “[*e*]liminat[ing] all locations outside the serving area of the cell that is reported as the serving cell” (EX1006, [0082] (emphasis added); Fig. 15) and suggests additional (multi-level) search strategies may be employed. *See e.g.*, [0083]-[0084]; [0099]:1-4.

A. Preamble of Claim 1 is Disclosed in Spain

69. Spain discloses “[a] method for determining the location of a mobile unit (mobile unit) in a wireless communication system.” EX1006, Abs. ll. 1-3.⁶

70. Thus, Spain discloses the Preamble of claim 1.

1. Element [1.1] is Disclosed in Spain

71. Element [1.1] recites “(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.” Spain discloses Element [1.1].

72. A “fingerprint” in Spain is created by providing a “predetermined *combination* of observable RF spectral parameters” [calibration data having

⁶ It is my understanding that Petitioner does not concede that the Preamble is limiting.

characterizing parameters observed at calibration points], such as “observed signal strengths.” EX1006, [0035]:4-7. Spain describes obtaining the longitude and latitude for each fingerprint entry. *See* Fig. 10 and [0099]:7-9. Spain also discloses providing the “possible serving cell site(s)” (*i.e.*, the identity of a serving cell) for each fingerprint entry, as another “characterizing parameter.” *See* [0070]-[0072] (“Initially, the location server maintains a database that lists all possible locations for the mobile unit”) and Table 1; [0080]:2-3 (definition of “serving cell”).

73. Spain’s fingerprints are comprised of “modified or unmodified network measurement data associated with a geographic location.”⁷ *See* Section XI.A. Additionally, Spain’s fingerprints are taken at calibration points as “geographic points with which calibration data is associated,” under the stipulated litigation construction. *See* Section XI. B.

74. Thus, Spain discloses each and every limitation of Element [1.1].

2. Element [1.2] is Disclosed in Spain

75. Element [1.2] recites “(b) generating one or more sets of grid points for said calibration data.” Spain discloses Element [1.2].

⁷ The “network measurement data” aspect of this construction in relation to cellular network signals is more fully explained with reference to element [1.3] below.

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76. The fingerprints of Spain are generated as one or more sets of “grid points”. My understanding is that Owner has indicated this limitation requires generating a random grid point such as a non-uniform grid point. *See, e.g.*, EX1012, ¶60 (“generation and use of such non-uniform grid points to create a more robust and denser ‘map’ of known locations”) (citing 10:29-11:21, 12:15-67); ¶61 (“inventive grid points” as non-uniform grid points (NUGs) “to fill in the map”); EX1007, p.3 (“the locations of and strengths of signals from Wi-Fi hotspots and cell towers to find additional locations that can be determined or calculated based on the calibration data and generates grid points associated with those locations”).⁸ In connection with this, Spain discloses generation of sets of grid points wherein each set includes newly interpolated grid points:

In another embodiment, the database is built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate [generate] the

⁸ It is my understanding that Owner referred to the same concept during prosecution. *See* ¶¶39-43 (Points 1 and 2); EX1002, p.50 (“no grid points are generated within any geographic region in Zeng that is associated with a particular set or sets of calibration data.”); *see also* EX1001, 27:45-56; 2:44-50 (general use of such NUGs).

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fingerprints at all locations in between the sampled locations [sets of grid points].

EX1006, [0101]:1-4.

To improve the accuracy of the fingerprint database, learning/training techniques and methodologies can be adopted for this problem.

EX1006, [0054]:1-3.

The inputs of the training step are a set of positions matched with the corresponding signal strengths, and the fingerprint measurements whose information should be considered in the learning process are added to the training set. The machine is then re-trained and a new grid is generated for the database, to replace the old one [to include generated “sets” of grid points from actual fingerprint measurements].

EX1006, [0055]:1-6.

The following list summarizes the major advantages of learning/training techniques: (1) *they offer a way to interpolate between grid points [generating grid points] and reconstruct the grid.*

EX1006, [0055]:6-9 (emphasis added).

77. Here, the two grid points used to interpolate an additional grid point or points and the generated additional grid point or points are collectively a generated

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“set” of grid points (i.e., a “set” which includes the two calibrated grid points *and* the associated interpolated grid points).

78. A POSITA would have understood these additional interpolated grid points are assigned to Spain’s possible serving cell clusters/sets in advance to support its initial location-based searching, as more fully described below. *See* EX1006, [0066]; [0070]-[0072] (“Initially, the location server maintains a database that lists all possible locations for the mobile unit”) and Table 1; [0082]; Fig. 15. These “possible serving cell site” keyed database entries of newly generated “sets of grid points” are later used to limit searching. *Id.*

79. To the extent that “clustering” of grid points *alone* is sufficient to meet this limitation, Spain’s disclosure of how clusters (sets) of grid points are generated during its fingerprint database creation – without newly interpolated grid points – that are organized around “possible serving cell site(s)” also meets this limitation.

80. Concerning the grid points themselves, Spain explains that “In one instance the fingerprint corresponds not to one exact spot on the surface of the earth, *but instead to a small area*. The Lat and Long fields in this embodiment indicate a *position inside the area*, preferably the center point.” EX1006, [0099] (emphasis added). As such, a grid point in Spain is “a point associated with representative calibration data for an area.” *See* Section XI.C.

81. Lastly, concerning the ordering of the claimed method steps, “providing” occurs before “generating” in Spain. *See* Section XI.D.

82. Thus, Spain discloses each and every limitation of Element [1.2].

3. Element [1.3] is Disclosed in Spain

83. Element [1.3] recites “(c) receiving at least one network measurement report from a mobile device at an unknown location in said geographic region.” Spain discloses Element [1.3].

84. Spain discloses that a captured fingerprint “is stored in the *fingerprint structure*” [*i.e.*, network measurement report] that includes characterizing parameters as described above with reference to element [1.1]. EX1006, [0097]:1-6; Fig. 9. Spain discloses that “[t]he fingerprint comprises characteristics of received signals at multiple frequencies” which includes signal strength. EX1006, [0098]:1-2; [0098]:24-26.

85. This claim limitation recites that at least one network measurement report is received *from* a mobile device. In one embodiment in Spain “the generated fingerprint (in the mobile unit) is transmitted to the location server over the wireless link” (EX1006, [0048] (emphasis added)), which expressly includes signal strengths and the identity of the current serving cell for the mobile unit. *See* Fig. 12, Step 1203 (“Receive: (1) the Cell ID of the Cell Site Servicing The Mobile Unit”); [0081] (“the

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cellular network receives the signal strength report”); [0082]; [0044]:7-10 (“[f]or example, in one instance the location server knows the approximate location of the mobile unit by receiving [the] **identity** of the (wireless communication network) cell that the mobile unit is in at that time.”) (emphasis added); [0057]:4-6; [0066].

86. Spain’s network measurement report is received by the location server **from** the mobile device.

87. Spain’s fingerprint structure addresses the defined data structure issue present in the prosecution history, which Owner may raise. *See* Section XI.D.

88. Spain discloses that its fingerprint database for location determination may be comprised of signals obtained from a cellular network. *See e.g.* EX1006, [0050] (“To improve the accuracy, as well as viability, of any algorithm for mobile unit location **based on measurements of base station signal strengths**, corrections for channel interference will be required.”) (emphasis added); *see also* [0035] (general discussion of Radio Frequency (RF) spectral fingerprint); [0036] (use of cellular hardware for fingerprint capture); [0042] (discussing filtering when using cellular signals for fingerprinting); [0050] (discussing design of fingerprint database to compensate for channel interference); [0051] (storage of interference corrected cellular fingerprints); [0076] (“Tasks 1201 though 1203 are normally performed by the cellular network as a part of its operation.”); [0078] (“each receivable signal is a

base station control channel”); [0110] (“only minor software changes in the mobile unit (typically a cellular phone) are required”); Fig. 12, Steps 1201-1203 (“Functions Performed by Cellular Network During Normal Operation”). In such embodiments, Spain’s database includes one or more sets of grid points, and a fingerprint report that is transmitted from the mobile device during location determination is “a report used in cellular networks which provides the results of a measurement from a mobile device on one or more cells,” and the corresponding database is constructed from the same cellular signals. *See* Section XI.D.

89. Thus, Spain discloses each and every limitation of Element [1.3].

4. Element [1.4] is Disclosed in Spain

90. Element [1.4] recites “(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.” Spain discloses Element [1.4].

91. Spain discloses evaluating as a database search limitation by using a current serving cell as a characterizing parameter transmitted from the mobile unit. The ’753 Patent expressly claims “the identification of a serving cell” as a characterizing parameter in dependent claim 9. Spain evaluates the “fingerprint structure” received from a mobile unit with each of the sets of grid points generated through interpolation (see element [1.2] above) as a function of the identity of a

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characterizing parameter, such as the current serving cell as the characterizing parameter. Spain explains this initial search evaluation (narrowing) as follows:

The length of time that the search takes to complete is related to its computational complexity.... Therefore, the length of time that the search takes to complete is related to the number of possible locations of the mobile unit that must be considered.

EX1006, [0064].

As the number of possible locations to search increases, the length of time to complete the search also increases. Analogously, as the number of possible locations to search decreases, the length of time to complete the search also decreases. Therefore, the illustrative embodiment seeks to reduce the length of time it takes to complete the search by reducing the number of possible locations that must be searched.

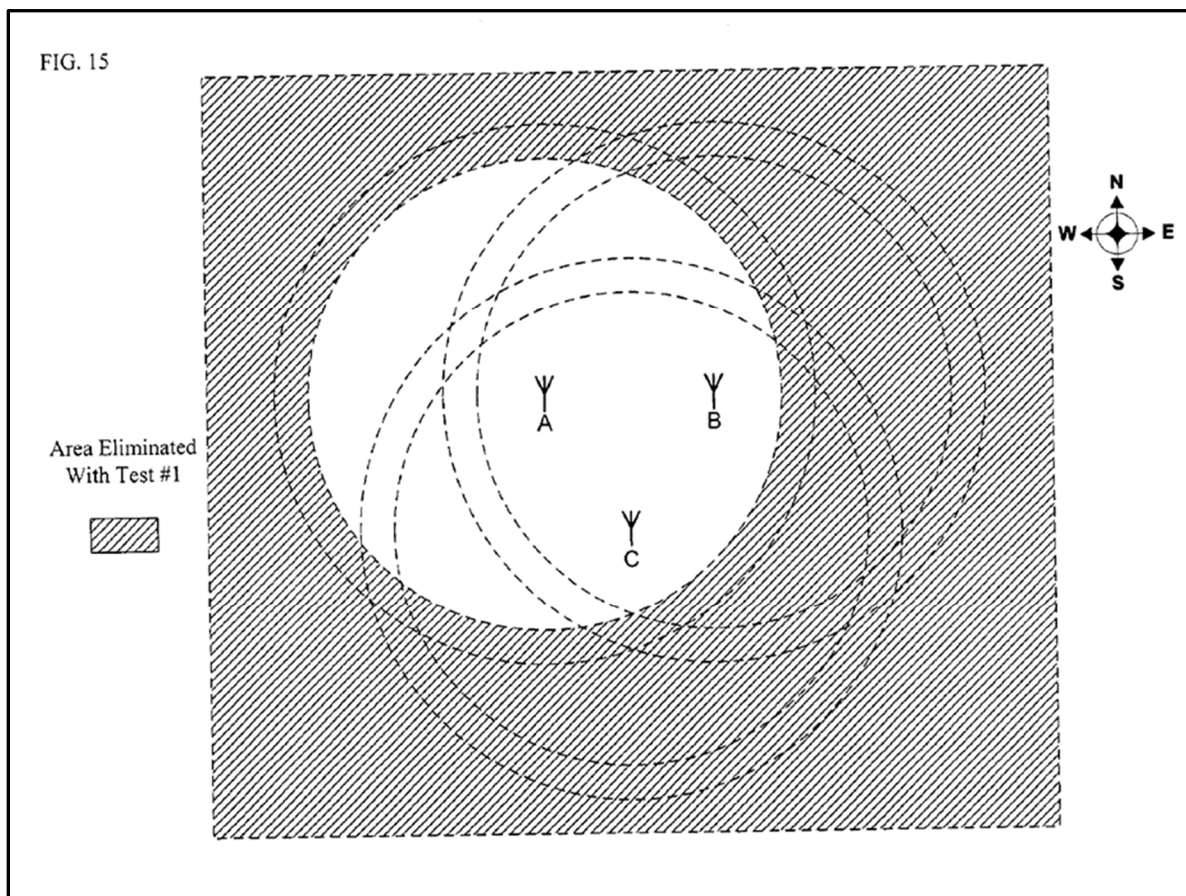
EX1006, [0065].

The number of possible locations of the mobile unit that must be searched *can be reduced when an approximate estimate of the mobile unit's location is available*. For example, an approximate estimate of the mobile unit's location *can be determined from the identity of the cell site serving the mobile unit*. This can, for example, reduce

the number of possible locations *by a factor of one thousand or more.*

EX1006, [0066] (emphasis added).

92. Spain's "Test #1" "[e]liminates all locations outside the serving area of the cell that is reported as the serving cell." EX1006, [0082] (emphasis added).



EX1006, Fig. 15.

93. Lastly, concerning the ordering of the claimed method steps, "generating" occurs before "evaluating" in Spain. *See* Section XI.E.

94. Thus, Spain discloses each and every limitation of Element [1.4].

5. Element [1.5] is Disclosed in Spain

95. Element [1.5] recites “(e) selecting a set of grid points as a function of a predetermined criteria.” Spain discloses Element [1.5].

96. Following Spain’s initial search evaluation (limitation) using a current serving cell as a characterizing parameter as discussed, Spain further discloses selecting a set of grid points.

97. Specifically, after its initial search limitation Spain discloses selecting multiple fingerprints (grid points) from the database as the “closest” by signal strength as the “predetermined criteria” and applying a separate interpolation step for the location estimation: “In one embodiment, the search algorithm takes more than one fingerprint from the database that are closest to the generated fingerprint and interpolates the most plausible location for the mobile unit from the locations of the chosen fingerprints.” EX1006, [0047]:11-15. (preceding paragraph discussing signal strength). “Closeness” can be the norm, such as the average squared distance. EX1006, [0057]:6-11.

98. This is consistent with the ’753 Patent’s recognition that at times a set of candidate grid points that are the “closest” may generate a location estimate. *See* EX1001, 18:54-60. This is also consistent with dependent claim 3, in which the “predetermined criteria” is a Euclidean Norm.

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99. Concerning “closeness” – Spain recognizes there are “many different ways to define ‘closeness’ between two fingerprints.” EX1006, [0057]:12-13. Agiwal (EX1005) provides further evidence of a way a POSITA would consider calculating “closeness” between signal strength fingerprints in the selection of multiple fingerprints in the same two-tiered searching context as Spain. *See* EX1005, p. 105, Section 3.2.1 (discussing k-best search); *see also* p.102, Abs. ll. 1-9 (method and system for determining the location); Abs. (use of radio map); p.104, Section 3.1.2 (clustering of radio map in advance to support location search); Abs., ll. 9-13 (receipt of signal strengths in network measurement report); p.105, Section 3.2.1 (initial estimated location based-search followed by signal strength search).

100. Lastly, concerning the ordering of the claimed method steps, “generating” occurs before “selecting” in Spain. *See* Section XI.E.

101. Thus, Spain discloses each and every limitation of Element [1.5].

6. Element [1.6] is Disclosed in Spain

102. Element [1.6] recites “(f) determining the location of a mobile device in said geographic region as a function of said selected set of grid points.” Spain discloses Element [1.6].

103. As, discussed directly above for [1.5]/(e), Spain discloses selecting multiple fingerprints (grid points) from the database as the “closest” by signal

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strength and interpolating for the location: “In one embodiment, the search algorithm takes more than one fingerprint from the database that are closest to the generated fingerprint and *interpolates the most plausible location for the MU from the locations of the chosen fingerprints.*” EX1006, [0047]:11-15 (emphasis added).

104. A POSITA would have appreciated this interpolation determines the location as a mathematical function of the selected closest fingerprints (grid points). This aspect of Spain is also consistent with the '753 Patent's own discussion concerning accuracy and interpolation between matching grid points. *See* EX1001, 18:54-60 (“An estimate of a mobile device's location may then be given by a grid point having the closest match thereto or a location interpolated between several grid point locations.”); 23:1-15 (“A further aspect of embodiments of the present subject matter may also improve location accuracy by interpolating between grid point locations when more than one grid point matches the calibration or reported data within a predetermined value... as the actual location of the mobile device is generally not constrained to lie at a grid point location, interpolation between grid points may result in a more accurate location estimate.”); Figs. 33/34 (and accompanying text).

105. Thus, Spain discloses each and every limitation of Element [1.6].

B. Claim 7 is Disclosed in Spain

106. Claim 7 recites “[t]he method of claim 1 wherein said calibration data comprises information from a network measurement report.” Spain discloses the subject matter of Claim 7.

107. In Spain, the fingerprint database is built using fingerprints captured and transmitted as reports, just as in location determination. *See* EX1006, [0056]:13-18; [0100], [0098], [0099], Figs. 9/10.

108. Thus, Spain discloses each and every limitation of Claim 7.

C. Claim 9 is Disclosed in Spain

109. Claim 9 recites “[t]he 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

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wireless network serving said mobile device, and combinations thereof.” Spain discloses the subject matter of Claim 9.

110. As explained above for claim 1, Spain includes a current serving cell identity when transmitting a network measurement report during location determination.

111. Accordingly, Spain discloses each and every limitation of Claim 9.

D. Preamble of Claim 32 is Disclosed in Spain

112. The Preamble of Claim 32 recites “A system for determining the location of a mobile device in a geographic region comprising.”⁹

113. Spain discloses the system of Claim 32. My explanation of Spain applied to the preamble of Claim 1 is applicable here because of the similarity of the claim language. *See also* EX1006, Abs., Figs. 1/2/11 (Wireless Communication System 1100).

114. Thus, Spain discloses the preamble of claim 32.

1. Element [32.1] is Disclosed in Spain

115. Element [32.1] recites “a database.” Spain discloses Element [32.1].

⁹ It is my understanding that Petitioner does not concede that the Preamble is limiting.

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116. Spain uses a fingerprint database. EX1006, [0047]:2-5; [0048]; Fig. 3, Step 307; Figs. 9/10 (and associated disclosure at [0098]-[0099]).

117. Thus, Spain discloses each and every limitation of Element [32.1].

2. Element [32.2] is disclosed in Spain

118. Element [32.2] recites “a processor for receiving calibration data for each of one or more calibration points in a geographic region and receiving at least one network measurement report from a mobile device at an unknown location in said geographic region, said calibration data and network measurement report having at least one characterizing parameter and said processor is programmed to.” Spain discloses Element [32.2].

119. My explanations of Claim 1, element [1.1]/(a) and [1.3]/(c) above, as well as Claim 7 concerning receipt of calibration data via a network measurement report are applicable here, because of the similarity of the claim language.

120. A POSITA would have appreciated that Spain’s “location server” includes a processor configured to receive calibration data which is entered into its database, and to receive a network measurement report from a mobile device at an unknown location *See e.g.*, [0100] (“In one embodiment, the database is built by taking off-line snapshots of fingerprints at various locations. The fingerprint information along with the coordinates of the location are entered into the

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database.”); [0048] (“In another embodiment, the fingerprint database is stored at the location server and the generated fingerprint (in the mobile unit) is transmitted to the location server over the wireless link.”).

121. Further, a POSITA would have appreciated that Spain’s “location server” processor is programmed to perform its location determination method as explained below. *See e.g.*, [0048] (“The search for the closest fingerprint is then done in the location server from which it determines the location of the mobile unit.”).

122. Beyond the POSITA’s understanding that Spain’s “location server” as a server includes a processor to perform its location determination method, other aspects of Spain confirm the same. *See e.g.*, [0049] (“The location server has a database into which it executes a search for the closest matching fingerprint, as shown in box 307. Box 309 shows *the process* culminating in the retrieval of the best matching fingerprint along with its corresponding location. In one embodiment the search also returns a confidence measure that depicts the closeness of the match.”) (emphasis added).

123. The disclosure of Spain in this regard is at least as detailed as that in the ’753 Patent. *See e.g.*, EX1001, 55:18-67; Fig. 70.

124. Thus, Spain discloses each and every limitation of Element [32.2].

3. Element [32.2.1] is Disclosed in Spain

125. Element [32.2.1] recites “generate one or more sets of grid points for said calibration data.” Spain discloses Element [32.2.1]. My explanation of Claim 1, element [1.2]/(b) above is applicable here because of the similarity of the claim language.

126. Thus, Spain discloses each and every limitation of [32.2.1].

4. Element [32.2.2] is Disclosed in Spain

127. Element [32.2.2] recites “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.” Spain discloses Element [32.2.2]. My explanation of Claim 1, element [1.4]/(d) above is applicable here because of the similarity of the claim language.

128. Thus, Spain discloses each and every limitation of [32.2.2].

5. Element [32.2.3] is Disclosed in Spain

129. Element [32.2.3] recites “select a set of grid points as a function of a predetermined criteria.” Spain discloses Element [32.2.3]. My explanation of Claim 1, element [1.5]/(e) above is applicable here because of the similarity of the claim language.

130. Thus, Spain discloses each and every limitation of [32.2.2].

6. Element [32.2.4] is Disclosed in Spain

131. Element [32.2.4] recites “determine the location of a mobile device in said geographic region as a function of said selected set.” Spain discloses Element [32.2.4]. My explanation of Claim 1, element [1.6]/(f) above is applicable here because of the similarity of the claim language.

132. Thus, Spain discloses each and every limitation of [32.2.4].

E. Claim 38 is Disclosed in Spain

133. Claim 38 recites “[t]he system of claim 32 wherein said calibration data comprises information from a network measurement report.” Spain discloses the subject matter of Claim 38. My explanation of Claim 7 above is applicable here because of the similarity of the claim language.

134. Accordingly, Spain discloses each and every limitation of Claim 38.

F. Claim 40 is Disclosed in Spain

135. Claim 40 recites “[t]he 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

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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” Spain discloses the subject matter of Claim 40. My explanation of Claim 9 above is applicable here because of the similarity of the claim language.

136. Accordingly, Spain discloses each and every limitation of Claim 40.

XIV. SECONDARY CONSIDERATIONS

137. As discussed herein, all elements of claims 1, 7, 9, 32, 38, and 40 were known in the art, and any differences would have been obvious to a POSITA based on the disclosures of the applied references and the knowledge in the art.

138. I am not aware of any secondary considerations that would alter my opinion. For instance, there was no long felt need as multiple different databases and calibration data used for determining locations of wireless device were known and used before the effective filing date of the ’753 Patent.

139. As another example, the ’753 Patent and its techniques are not widely used in the art or incorporated into any commercially successful location determination systems. I am not aware of a location determination system that is commercially successful marked with the ’753 Patent.

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140. Any secondary considerations evidence Patent Owner may offer in this proceeding would be insufficient to overcome the strong evidence that claims 1, 7, 9, 32, 38, and 40 are obvious.

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XV. CONCLUSION

141. For the reasons set forth above, it is my opinion that all elements of Claims 1, 7, 9, 32, 38, and 40 of the '753 Patent are disclosed or suggested by the prior art. In my opinion, Claims 1, 7, 9, 32, 38, and 40 of the '753 Patent would have been anticipated or obvious over the prior art.

142. In signing this Declaration, I understand that the Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

143. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: ____August 4, 2023____



David H. Williams

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APPENDIX 1

I have previously testified and/or been consulted as an expert in the
following matters:

Clients	Filing Date	Court Case Information (if applicable)
BJs Wholesale	April 2023 (Institution Scheduling Order)	BJ'S WHOLESALE CLUB HOLDINGS, INC. v. WALMART APOLLO, LLC; PTAB; IPR2022-01496, Patent 10,368,187 B1; IPR2022-01509, Patent 10,368,188 B2; Deposition
OHD (Overhead Door)	August 2020	ITC, Overhead Door Corporation and GMI Holdings Inc. v. The Chamberlin Group (CGI), In the Matter of CERTAIN MOVABLE BARRIER OPERATOR SYSTEMS AND COMPONENTS THEREOF, Investigation No. 337-TA-1209 – Deposition on Enforcement Proceeding
UTTO	March 25,2022	UTTO INC., Plaintiff, v. METROTECH CORPORATION, Defendant. Court: United States District Court, Northern District of California 22-cv-01904-WHO (N.D. Cal. Dec. 19, 2022); Deposition
Pacific Controls Inc.	12/12/2019 (Decision defining final scope)	PACIFIC CONTROLS, INC. v. CUMMINS INC., UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK; CASE NO. 19-cv-3428

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		(MKV) (BCM); Deposition, Testimony
State of New York	2021	State of NY vs. Kenneth Cramer; Case: 44-1-2022-0174; Mental Hygiene Legal Service, Appellate Division, Third Judicial Dept.; Testimony
HP, Aruba	May 25, 2021	BILLJCO, LLC,. Plaintiff, vs. Case No. 2:21-cv-0018e-JRG HEWLETT PACKARD ENTERPRISE COMPANY, ARUBA NETWORKS, LLC; Eastern District Court of Texas (EDTX); Depositions (2);
Lyft	November 30, 2020	Lyft, Inc. vs. Rideshare Displays; PTAB; IPR2021-01598, -01599, -01600, -01601, -01602; Deposition
Google, VIVINT, Ecobee	4/28/2021	ECOFACITOR, INC. v. GOOGLE LLC (Nest), Civil Action No. 6:20-cv-00075 (ADA) ECOFACITOR, INC. v. ECOBEE, INC., Case No. 6:20-cv-00078-ADA ECOFACITOR, INC. v. VIVINT, INC., Case No. 6:20-cv-00080-ADA; Western District of Texas (WDTX); Deposition and Testimony – (Google case, being appealed); Ecobee and VIVINT trial pending
GMG (Green Mountain Grill)	11/24/2020	ITC, Traeger v. GMG, In matter of CERTAIN CLOUD-CONNECTED WOOD-PELLET GRILLS AND COMPONENTS THEREOF, Investigation No. 337-TA-1237 – Deposition, Testimony;
OHD (Overhead Door)	August 2020	ITC, Overhead Door Corporation and GMI Holdings Inc. v. The Chamberlin Group (CGI), In the

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		Matter of CERTAIN MOVABLE BARRIER OPERATOR SYSTEMS AND COMPONENTS THEREOF, Investigation No. 337-TA-1209 – Report, Deposition and Testimony on 2 patents;
Draft Kings	6/17/2020	DRAFTKINGS INC. v. INTERACTIVE GAMES LLC (PTAB), IPR2020-01107 - Depositions (2)
Target	5/15/2020	TARGET CORPORATION V. PROXICOM WIRELESS, LLC; Case 2020-00903 (PTAB); Depositions (7)
Heil	September 5, 2017	SONRAI SYSTEMS, LLC V. ROMANO ET.AL, NORTHERN DISTRICT OF ILLINOIS (EASTERN DIVISION) – DEPOSITION; IN PROGRESS
Zillow	July 2, 2019	Corus Realty Holdings, Inc. v. Zillow Group Inc., et al., Case No.21:18-cv-00847-JLR (WD. Wash) – Deposition;
Lyft	July 23, 2018	RideApp, In. v. Lyft, Inc., Case No 3:18-cv-07152-JST (U.S. District Court for the Northern District of California) – Deposition;
FedEx	Case filed August 31, 2016	Intellectual Ventures II v. Fed Ex, Eastern District Court of Texas), Civil Action No. 2:16-cv-00980-JRG. Deposition and Testimony;
Google	Declarations filed May 15, 2018	AGIS v. Google, Cases Nos. IPR 2018-01079, -01080 (PTAB), Depositions (2)

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Samsung	2018	IPR2018-01554 for SAMSUNG ELECTRONICS CO., LTD. v. IRON OAK TECHNOLOGIES, LLC., Patent No. 5,966,658. (Declaration, no Deposition)
A&V Oil and Gas	Internal Audit Report – 2017 August 17	A&V Oil and Gas Limited v Petrotrin Arbitration, dispute triggered by Internal Audit report by Petroleum Company of Trinidad and Tobago, Limited. – Testimony;
Gounaris Abboud Co., LPA	Indictment April 14, 2017	State of Ohio, Montgomery County v. Brandon Howard. The Court of Common Pleas. Case 2017 CR 00769/1 Docket ID: 3077144, (Video) Testimony in Daubert Hearing regarding validity of Google Timeline as forensic/location data collection tool.
John Hamilton (compensation via State of Tennessee)	Incident, December 26, 2016	State of Tennessee v. Xavier Martin (associated with State. v. Marlando Shuntell Sturghill, Docket 17-237), Testimony at trial;
Google	Declarations submitted June 24, 2015	Google Inc. (Nest), et al. v. e.Digital Corp., Case Nos. IPR2015-01470, -01471, -01472, -01473, -1474, -01475 (PTAB), Depositions (2);
Macropoint	PTAB Decisions: March 16, 2018, and March 19, 2018, respectively	RUIZ FOOD PRODUCTS, INC. v. MACROPOINT LLC, Case IPR2017-02016, IPR2017-02018; (PTAB); Deposition
Liberty Law (Canada)	Incident date May 10, 2016	Edmonton Alberta Law Courts, RCMP v. Travis Vader (Report), Testimony/Attendance at Trial; Report/Testimony issue

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Geotab	Infringement Contentions 11/13/2015	Perdiem co, LLC vs. Industrack, LLC, et al., Case No. 2:15-cv-727- JRG-RSP (E.D. Tex.), Deposition;
Twilio	Filed Feb 6, 2018	Twilio Inc. v. TeleSign Corp., Case No. IPR2016-00360 (Northern District of California), Deposition
City of Houston Police Department	Indefinite Suspension Issued on February 19, 2016	Houston Police Department v. Officer Ernest W. Walker, Issue #48549-2015 and #48675-2015, Report, Testified at Arbitration;
VIVINT Inc.	Institution Decision March 30, 2016	Alarm.com v. Vivint Inc., Case No. IPR2015-01965 (PTAB), Deposition;
Samsung	2013	ITC, Black Hills Media v. Samsung, In the Matter of CERTAIN DIGITAL MEDIA DEVICES, INCLUDING TELEVISIONS, BLU- RAY DISC PLAYERS, HOME THEATER SYSTEMS, TABLETS AND MOBILE PHONES, COMPONENTS THEREOF AND ASSOCIATED SOFTWARE. Consultant (no report);
Peschke Map Technologies LLC, Plaintiff (On behalf of several defendants)	Petition filed on July 2, 2013	Peschke Map Technologies LLC v. J.J. Gumberg Co, Case No. 12-cv- 1525-SLR (D. Del.), Deposition;