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. IPR2023-01210
U.S. Patent No. 8,400,358

PATENT OWNER'S RESPONSE

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LIST OF EXHIBITS

Exhibit No.	Petitioner's Exhibits
1001	U.S. Patent No. 8,400,358, issued on March 19, 2013 ("the '358 Patent")
1002	File History of U.S. Patent Application No. 12/424,320, filed on April 15, 2009 ("the '320 Application")
1003	File History of Reexamination Control No. 90/012,694 ("the '694 Reexam")
1004	Reexamination Certificate issued on August 18, 2014 (Reexamination Control No. 90/012,694)
1005	U.S. Provisional Application No. 60/899,379, filed on February 5, 2007 ("the '379 Provisional")
1006	U.S. Patent No. 7,706,811 ("Shkedi")
1007	U.S. Patent No. 9,097,784, issued on August 4, 2015 (the '784 Patent)
1008	U.S. Patent No. 8,406,753, issued on March 26, 2013 ("the '753 Patent")
1009	U.S. Patent Application Publication No. 2003/0064735, published on April 3, 2003 to D. Spain et al. ("Spain")
1010	Jian Zhu and G. D. Durgin, "Indoor/outdoor location of cellular handsets based on received signal strength," 2005 IEEE 61st Vehicular Technology Conference, Stockholm, Sweden, 2005, pp.92-96, Vol. 1, doi: 10.1109/VETECS.2005.1543256 ("Zhu")
1011	Heikki Laitinen, Jaakko Lähteenmäki, Tero Nordström, "Database Correlation Method for GSM Location," VTT Information Technology, IEEE, 2001. ("Laitinen")
1012	Declaration of David Hilliard Williams

1013	Curriculum Vitae of David Hilliard Williams
1014	Declaration of Dr. Sylvia Hall-Ellis
1015	Curriculum Vitae of Dr. Sylvia Hall-Ellis
1016	Complaint dated November 22, 2022, *Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.*, Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022 ("the Related Litigation")
1017	Not Assigned
1018	U.S. Patent No. 7,561,104 ("the '104 Patent")
1019	File History of U.S. Patent Application No. 12/026,333, filed on February 5, 2008 ("the '333 Application")
1020-1023	Not Assigned
1024	Plaintiff Geoscope Technologies PTE. LTD.'s Opening Claim Construction Brief dated May 26, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.*, 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, *Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.*, Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1026	Not Assigned
1027	Appendix B to Plaintiff Geoscope Technologies Pte. Ltd.'s Preliminary Infringement Contentions dated April 7, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.*, Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1028	Claim Construction Memorandum Opinion & Order dated July 19, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a*

	Google Inc., Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
	Patent Owner's Exhibits
2001	Declaration of Christopher M. Gerson in Support of Patent Owner's Motion for Pro Hac Vice Admission of Christopher M. Gerson Under 37 C.F.R. § 42.10(c)
2002	*Not Assigned*
2003	Memorandum Opinion on Google's Motion for Judgment on the Pleadings on Patent Eligibility dated September 18, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC*, Civ. Action No. 1:22-cv-01331 (EDVA)
2004	Memorandum Opinion on Apple's Motion for Judgment on the Pleadings on Patent Eligibility dated September 18, 2023, *Geoscope Technologies Pte. Ltd. v. Apple Inc.*, Civ. Action No. 1:22-cv-01373 (EDVA)
2005	Final Judgment dated October 6, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC*, Civ. Action No. 1:22-cv-01331 (EDVA)
2006	Final Judgment dated October 5, 2023, *Geoscope Technologies Pte. Ltd. v. Apple Inc.*, Civ. Action No. 1:22-cv-01373 (EDVA)
2007	Order dated June 26, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC*, Civ. Action No. 1:22-cv-01331 (EDVA)
2008	Email from Saunak Desai to Stephen E. Noona, "Geoscope v. Google - Claim Narrowing" (June 12, 2023)
2009	Claim Construction Memorandum Opinion & Order dated July 19, 2023, *Geoscope Technologies Pte. Ltd. v. Apple Inc.*, Civ. Action No. 1:22-cv-01373 (EDVA)
2010	Order dated June 26, 2023, *Geoscope Technologies Pte. Ltd. v. Apple Inc.*, Civ. Action No. 1:22-cv-01373 (EDVA)

2011	Defendant Google LLC's Final Invalidity Contentions dated July 3, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC*, Civ. Action No. 1:22-cv-01331 (EDVA)
2012	Geoscope's Opening Appeal Brief dated November 17, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC, Apple Inc.,* Case Nos. 24-1003 (Lead) 24-1018 (member) (Fed. Cir.)
2013-2016	*Not Assigned*
2017	Preliminary Identification of Asserted Claims dated March 27, 2023, *Geoscope Technologies Pte. Ltd. v. Google LLC*, Civ. Action No. 1:22-cv-01331 (EDVA)
2018	Declaration of Saunak K. Desai in Support of Patent Owner's Motion for Pro Hac Vice Admission of Christopher M. Gerson Under 37 C.F.R. § 42.10(c)
2019	*Not Assigned*
2020	Declaration of Mark Alan Sturza
2021	*Curriculum Vitae* of Mark Alan Sturza
2022	Deposition Transcript of David Hilliard Williams for IPR2023-01212 (U.S. Pat. No. 8,406,753) (April 23, 2024)
2023	Deposition Transcript of David Hilliard Williams for IPR2023-01209, -01210, -01211 (U.S. Pat. Nos. 7,561,104, 8,786,494 and 8,400,358) (April 23, 2024)
2024	Patent Owner's Statutory Disclaimer of Claims 1, 15, 41, and 52 of the '358 Patent

I. CLAIMS AT ISSUE

The Board instituted *inter partes* review of claims 1, 15, 18, 41, and 52 of U.S. Patent No. 8,400,358 ("'358 Patent"). D.I. at 40. Patent Owner has statutorily disclaimed claims 1, 15, 41, and 52. Ex. 2024. Accordingly, Patent Owner's Response focuses exclusively on claim 18 of the '358 Patent.

II. INTRODUCTION

The Board should refuse to find claim 18 of the '358 Patent unpatentable because none of Petitioner's art—individually or in combination—disclose at least the claimed non-uniform grid points.

Claim 18 requires that the database of claim 15 comprise "previously-gathered calibration data ***for one or more non-uniform grid points within said region***." Ex. 1001 at cl. 18 (emphasis added). The term "grid point"—and "non-uniform grid point" (or "NUG")—are not used generically in the '358 Patent. They are not just any points on a grid. Rather, as informed by the intrinsic record, the "grid points" are defined by and generated based on evaluation of previously-gathered calibration data. Notably, the parent provisional application incorporated by reference in the '358 Patent explicitly states that "[t]he geometrical shape and the amount of data accumulated into such NUGs is seen to be variable ***since these are determined by the statistical similarity of the data allocated to a NUG*.**" Ex. 1005

at 7[1] (emphasis added). In other words, the claimed "non-uniform grid point" does not and cannot exist until after calibration data is acquired and evaluated.

In the Related Litigation (*Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.*, Civ. Action No. 1:22-cv-01331 (EDVA)), the district court recognized this defining requirement and construed "grid point" as "a point associated with representative calibration data for an area." Ex. 1028 at 20. That the claimed grid points are associated with "***representative*** calibration data ***for an area***"—not just any calibration data—requires by its plain language that the calibration data be evaluated to determine what constitutes such representative data and the boundaries of the area represented by that data. This representative data—which is a subset of the calibration data gathered within the broader "predetermined region" (*see* Ex. 1001 at cl. 15)—is then associated with a "grid point" so that it represents the area within these determined boundaries. This results in the claimed grid points being "non-uniform" with respect to their shape, size, and distribution throughout the region.

To the extent the Board finds that the construction of "grid point" adopted by the district court does not require that the claimed grid points, including their

[1] References to Ex. 1005 refer to the pdf page (*e.g.*, "Page 7 of 40") rather than the internal pagination of the document.

geographical boundaries, be generated based on evaluation of calibration data, the Board should adopt a construction of the term "non-uniform grid point" expressly reciting that requirement. As explained below, the intrinsic evidence confirms that such a construction is proper. Especially as further limited to "non-uniform grid points," the intrinsic evidence confirms that the claim scope is drawn to an unconventional approach to defining data structures for geolocation. For example, the figure reproduced below from a related patent depicts three "non-uniform grid points" or "NUGs," showing that they look nothing like any conventional conception of a "grid" or "grid points."

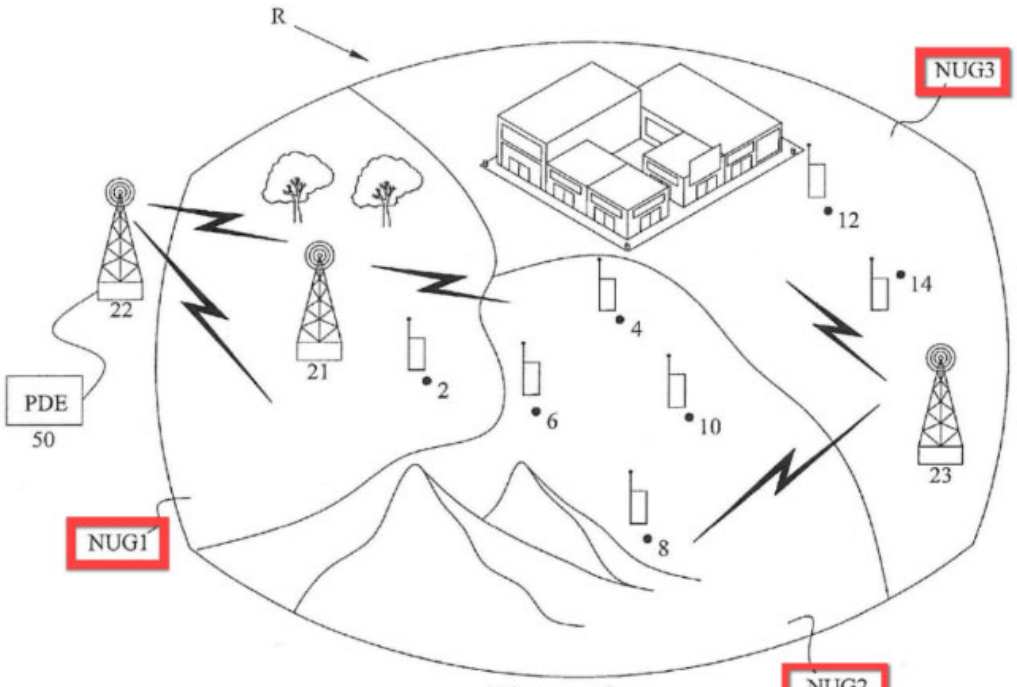

Figure 6

Ex. 1007 at Fig. 6.

None of Petitioner's art teaches the additional limitation of claim 18 under the proper construction of "non-uniform grid point." The asserted art only discloses conventional predefined grids and points that are fundamentally different from the grid points claimed in the '358 Patent. Thus, Petitioner fails to meet its burden to prove that this claim is unpatentable when it is properly construed.

III. OVERVIEW OF THE '358 PATENT

The '358 Patent is directed to an invention for determining the location of a mobile device (or "geolocating") using signal information from wireless communications networks (*e.g.*, cellular signals). Ex. 1001 at 1:52-60; Ex. 2020 ¶ 59. To accomplish this, the claimed inventions recite providing a database of "calibration data" and collecting "network measurement data" observed by the mobile device. Ex. 1001 at cl. 1. The observed network measurement data is then modified to account for varying conditions and other variables that may be caused by, for example, environmental factors or signals propagating indoors. Ex. 1001 at 3:50-56; Ex. 2020 ¶ 59. Once modified, the observed network measurement data is compared with the database of calibration data to determine the location of the mobile device. Ex. 1001 at 3:50-56; Ex. 2020 ¶ 59.

The invention of the '358 Patent addresses a particular problem in geolocation involving disparities between calibration data and observed data caused by "varying conditions and other operational variables" affecting how signals propagate in

different environments, resulting in "poor estimated location accuracy." Ex. 1001 at 1:39-46, 9:46-50; Ex. 2020 ¶ 60. One common reason for this disparity is that calibration data is "typically collected in an outdoor environment" because it is "time-consuming to perform calibration procedures indoors." Ex. 1001 at 1:30-38. However, geolocation within a building—using observed data collected indoors—is often desirable. Ex. 1001 at 1:30-38; Ex. 2020 ¶ 60. The differences in signal propagation outdoors versus indoors can make it difficult to perform an appropriate comparison of calibration data (collected outdoors) to observed data for geolocation, especially where that observed data is collected indoors. Ex. 1001 at 1:30-38; Ex. 2020 ¶ 60. To solve this problem, the '358 Patent independent claims are directed to modifying the observed data measured by a mobile device to eliminate disparities with previously-gathered calibration data. Ex. 1001 at cl. 1. The specification describes at length what these modifications may entail and how they are performed. Ex. 1001 at 5:14-55, 6:1-6:62, 6:63-7:30; Ex. 2020 ¶ 60.

A. Non-Uniform Grid Points of the '358 Patent

Dependent claim 18 of the '358 Patent further recites the use of what the patent refers to as "non-uniform grid points." As explained below, the claimed grid points of the '358 Patent are data structures that are generated from and associated with signal information based on evaluation of the similarities between calibration data that has been collected in a region. Because the grid points are generated based

on the calibration data—rather than being predefined—their geographical boundaries, location, and associated signal information are not defined until determined from evaluation of the calibration data. Ex. 2020 ¶ 61. The grid points serve as additional known locations associated with signal information, creating a denser "map" for mobile devices to compare observed data to for the purpose of determining their location.

The grid points of the '358 Patent "usually will not be uniformly distributed throughout the geographic region," and thus the '358 Patent (and related patents) uses the term "non-uniform grid points" or "NUGs" when describing grid points. Ex. 1008 at 2:43-50; *see also* Ex. 1001 at 3:57-67; Ex. 2020 ¶ 62.[2] The claimed grid

[2] U.S. Patent No. 8,406,753 (Ex. 1008; "'753 Patent") and U.S. Patent No. 9,097,784 (Ex. 1007; "'784 Patent") claim priority to the same provisional application (U.S. Provisional Application No. 60/899,379 (Ex. 1005; "'379 Provisional") as the '358 Patent, and also describe "grid points" as the term is used in this patent family. The '379 Provisional is incorporated by reference in the '358 Patent (Ex. 1001 at 1:10-14) and includes disclosures regarding "grid points" that are also found in the '753 and '784 Patents. *See* Ex. 1005 at 5-7. Thus, in the Related Litigation, the district court relied on disclosures in the '753 Patent and '784 Patent in construing the term "grid point." *See* Ex. 1028 at 19-20 (citing '753 Patent (as "Ex. E") and '784 Patent

points "represent an area of collected calibration data" and "represent the signal characteristics and/or calibration data over a given region." Ex. 1001 at 3:57-67; Ex. 2020 ¶ 62.

This is depicted in the related '784 Patent, which shows "a geographical region (R) having NUGs represented by NUG1, NUG2, and NUG3," and explains "[a] NUG may be generated to represent the signal characteristics and calibration data over a given region." Ex. 1007 at 6:21-34.

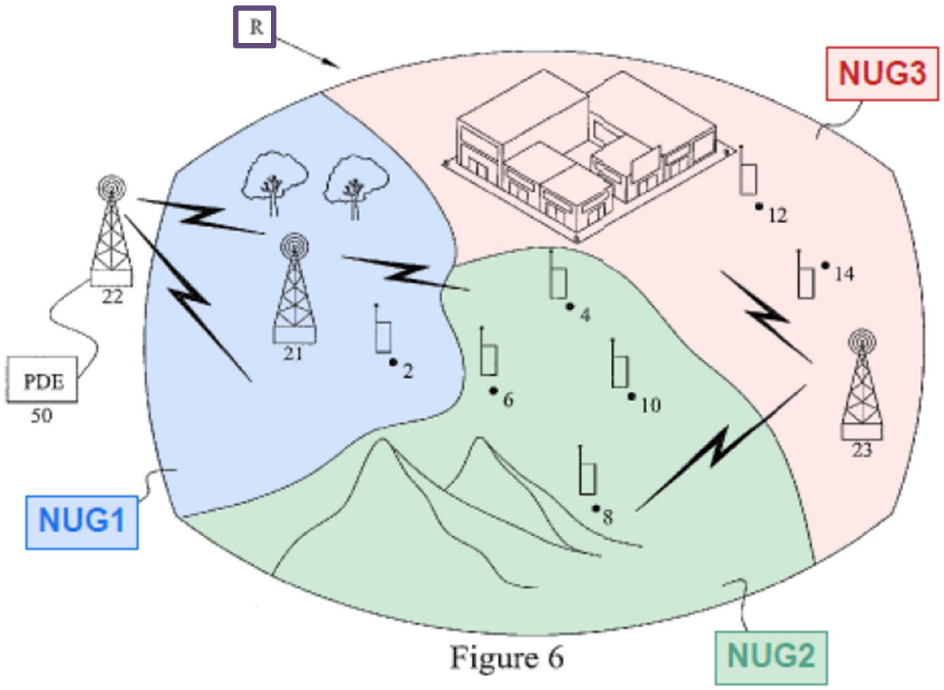

Figure 6

(as "Ex. F")). Petitioner has also recognized that the related '753 Patent "describe[s] more fully" the "non-uniform grid points" of the '358 Patent. *See* Pet. at 32.

Id. at Fig. 6 (annotated to show each NUG in geographical region R in a different color); Ex. 2020 ¶ 64.

As seen in the figure, each NUG corresponds to a particular area within the entire "geographical region (R)." Ex. 1007 at Fig. 6, 6:21-34; Ex. 2020 ¶ 65. And the calibration data associated with a particular NUG is representative of that area. For example, the subset of calibration data gathered in the region that is associated with NUG1 is representative of the area delineated by the boundaries of NUG1. Ex. 1007 at Fig. 6, 6:21-34; Ex. 2020 ¶ 65.

Additionally, as seen in the figure, the boundaries for each NUG differ, resulting in each NUG having a different shape and size. Consequently, the grid points are not uniform and look nothing like any conventional notion of a "grid." Ex. 2020 ¶ 66. This is because the boundaries of each grid point are defined by the calibration data itself. Ex. 1005 at 7; Ex. 1008 at 12:7-14; Ex. 2020 ¶ 66. Calibration data associated with a grid point must represent the area encompassed by that grid point—*e.g.*, the calibration data associated with NUG1 represents the area within the boundaries of NUG1. Ex. 1007 at Fig. 6; Ex. 2020 ¶ 66. Until that evaluation, the boundaries are undefined and the claimed grid point does not exist. Ex. 2020 ¶ 66. As a result, the shape of each NUG is variable because it is based on evaluation of the calibration data—which itself varies throughout a region—rather than being

predefined. Ex. 2020 ¶ 67. This is stated explicitly in the '379 Provisional incorporated by reference in the '358 Patent as well as in the related '753 Patent:

> The NUGs fully cover the region R and each NUG has statistically similar data accumulated into itself. ***The geometrical shape and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG.***

Ex. 1005 at 7 (emphasis added); *see also* Ex. 1001 at 1:10-15 (stating that the '379 Provisional is "incorporated by reference in its entirety" in the '358 Patent); Ex. 2020 ¶ 67.

> The NUGs may fully cover the region R and each NUG may have statistically similar data accumulated into itself. ***The geometrical shape (i.e., the shape defined by the union of locations of calibration points assigned to the NUG) and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG***.

Ex. 1008 at 12:7-14 (emphasis added); Ex. 2020 ¶ 67.

Thus, a fundamental characteristic of a claimed grid point is that the geographical boundaries of the area it represents must be determined by evaluating the calibration data collected in a region. Ex. 2020 ¶ 68. The related '753 Patent further confirms this central aspect of the claimed grid points, explaining they are generated based on evaluation of measured calibration data:

The location of a wireless mobile device may be estimated 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 is gathered and analyzed so that particular 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.

Ex. 1008 at Abstract, 9:34-39 (emphasis added); Ex. 2020 ¶ 68.

This evaluation of calibration data involves determining which data are "statistically very similar" using "increasingly stringent tests of statistical sufficiency" such that they can be associated with (or "allocated to") a particular grid point. Ex. 1005 at 6-7; Ex. 1008 at 10:44-59; Ex. 2020 ¶ 69. The "[s]tatistical similarity" of the gathered calibration data can be evaluated to determine where a grid point should be generated, if one should be generated at all, and what subset of gathered calibration data should be allocated to it. Ex. 1005 at 6-7; Ex. 1008 at 10:66-11:6; Ex. 2020 ¶ 69. This "[s]tatistical similarity" in the calibration data can be evaluated using different types of statistical analyses including clustering tests, a probability density function, the mean and variance of the data, or other functions of the calibration data. Ex. 1005 at 6; Ex. 1008 at 10:66-11:6, 12:4-14; Ex. 2020 ¶ 69.

The manner in which the measured calibration data is evaluated and allocated to each grid point further shows why the boundaries of the grid points are variable

and dependent on the calibration data. Ex. 2020 ¶ 70. For example, the calibration data is evaluated to determine whether it "exhibit[s] clustering" and, based on that evaluation, is allocated to different grid points. Ex. 1005 at 6; Ex. 1008 at 10:46-47; Ex. 2020 ¶ 70. If clusters of data collected at different locations (referred to as "calibration points") are "statistically very similar," then the data for those calibration points is allocated to the same grid point. Ex. 1005 at 6; Ex. 1008 at 10:55-59; Ex. 2020 ¶ 70. If, however, these clusters of data are determined to be "sufficiently different," then they are allocated to different grid points. Ex. 1005 at 6; Ex. 1008 at 10:50-55; Ex. 2020 ¶ 70. Because the "geometrical shape" of the area represented by a grid point is "defined by the union of locations of calibration points" allocated to it, this process of evaluating the calibration data in order to allocate it to different grid points defines the boundaries of that area. Ex. 1005 at 7; Ex. 1008 at 12:9-14; Ex. 2020 ¶ 70.

IV. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner has defined a person of ordinary skill in the art ("POSITA") as "someone knowledgeable in wireless networks, cellular radio systems, mobile communication devices and radio navigation systems, having at least a bachelor's degree in electrical engineering, with a background in radio frequency communications and/or navigation system technology as well as approximately two years of industry experience working on radio communication and/or navigation

systems." Pet. at 13. Patent Owner does not dispute this definition for purposes of this proceeding. *See* Ex. 2020 ¶¶ 47-48.

V. SUMMARY OF THE REFERENCES ASSERTED IN THE PETITION

A. Shkedi

Shkedi describes a method for determining the location of a mobile communications device comprising the steps of (1) "[r]egistering a selected location by first-causing a portable RF communications device at the selected location" to measure the signal strength of signals received "from a plurality of local fixed-location service-area antenna stations"; (2) "[r]ecording the selected location by electronically storing at least two of the respective reception signal strength measurements"; (3) "[m]onitoring by second-causing a portable RF communications device" to measure the signal strength of signals received "from a plurality of respectively local fixed-location service-area antenna stations"; and (4) "[d]etermining if the portable RF communications device of the Monitoring step is at the selected location of the registering step by electronically comparing measurements in the monitoring step with the stored at least two measurement of the Recording step." Ex. 1006 at 5:36-63.

Shkedi explains that the "Registration" step is "a data collection step where the portable device comes to measure the antenna signal space reception characteristics at the selected location." *Id.* at 11:18-28. As part of the "Registration"

and "Recording" steps, the portable RF communications device "access[es] a GPS location coordinate for the selected location" and "keep[s] the GPS location coordinate with the stored signal strength measurements." *Id.* at 13:9-14.

B. Zhu

Zhu describes a study evaluating the accuracy of Received Signal Strength (RSS) location techniques indoors. Ex. 1010 at 92. In particular, Zhu describes a method for locating a wireless handset using a "RF Map Database (RFMD)" comprising a "two-dimensional raster array with uniform grid spacings of 10m squares" representing a cellular network area. Each point in the raster array "corresponds to a location within the network and contains a vector of received signal strength indicator (RSSI) values in dBm for all audible base stations." *Id.* at 93. Zhu explains that "[a] modeled estimate of signal strength, P_R, is placed at every raster point" in the array and then compared to signal strength measurements taken with a wireless handset. *Id.* at 92-93. For areas "far from measured points," Zhu relies on "purely modeled signal strength" but for areas "that are several raster points away from measured data points," Zhu uses "a weighted combination of the modeled values and the value of nearby measurement point" in a process called "local interpolation." *Id.* The difference in the regions of data populated between taking measurements, interpolating, and modeling is depicted in Figure 2 of Zhu (reproduced below).

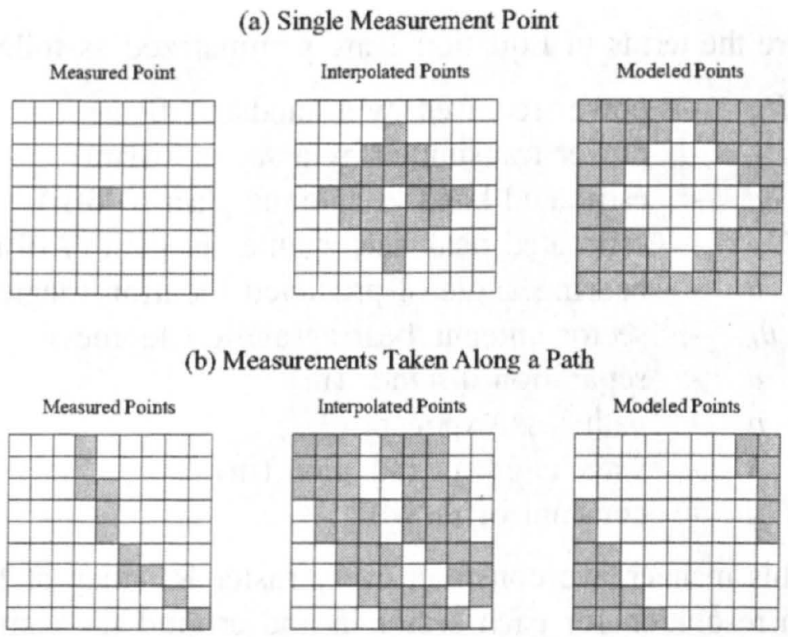

Fig. 2. Marked raster regions (in gray) for (a) a single measurement and (b) a path of measurements.

As seen in the figure, the grid of Zhu is predefined and uniform. The location and boundaries of squares in the grid are not based on any measurements. Indeed, the grid is defined prior to any such measurements.

C. Spain

Spain describes a "method for determining the location of a mobile unit" using "a fingerprint database that contains a number of fingerprints along with their corresponding location identities." Ex. 1009 at Abstract, [0047]. Figure 10 of Spain (reproduced below) shows the structure of the fingerprint database, which includes "Lat and Long fields [that] indicate the latitude and longitude of the location to which the fingerprint corresponds" and "the time at which the fingerprint was captured." *Id.* at [0099].

501

Fingerprint Database					
No.	Lat.	Long.	Time	Fingerprint	Description
1					
2					
3					
4					
5					
6					
…					
L					

Fig. 10

As used in Spain, "fingerprint" refers to "a predetermined combination of observable RF spectral parameters." *Id.* at [0035]. Spain describes building the fingerprint database by "taking off-line snapshots of fingerprints at various locations" or "taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints at all locations in between the sampled locations." *Id.* at [0100]-[0101]. Spain further describes that the "complete grid of locations for the cellular service area" can be used as training data to improve the accuracy of the fingerprint database using "learning/training techniques." *Id.* at [0054]-[0055]. Although Spain provides scant detail on the "learning/training techniques," Spain explains that "[p]osition will be used as the input value, while signal strength will be used as the target value." *Id.* at [0054].

D. Laitinen

Laitinen describes a "Database Correlation Method (DCM)" that determines the location of a mobile station "by comparing the transmitted fingerprint [i.e., "signal information samples"] and the fingerprints of the database." Ex. 1011 at 2505. Central to DCM is the creation and maintenance of the database, which is built by collecting measurements over a "street grid of the trial area" at regular (*i.e.*, uniform) intervals. *Id.* at 2504-06. Laitinen distinguishes DCM from other location methods because it "requires no new hardware at [base station] sites" and creates "the signal strength database through measurements instead of computations." *Id.* at 2505. Laitinen specifically describes the implementation of DCM to GSM "using the signal strength measurements performed by all GSM handsets." *Id.* at 2504. Laitinen describes how in GSM, "only the LAC [Location Area Code] is known to the network" in idle mode, and thus, the mobile station "must be able to transmit the available parameters to the location server," such as signal strength measurements and cell ID. *Id* at 2505.

VI. <u>CLAIM CONSTRUCTION</u>

Petitioner proposed constructions for five terms found in the challenged claims of the '358 Patent. Pet. at 14-17. The Board adopted those constructions for purposes of its Institution Decision. D.I. at 9-11. The Board construed "grid point" as "a point associated with representative calibration data for an area," which is

nominally the same construction adopted by the district court in the Related Litigation. D.I. at 9-11. Additionally, for purposes of the Institution Decision, the Board preliminarily construed "non-uniform grid points" as "grid points that are non-uniformly spaced throughout a geographic region." *Id*. at 25.

Although the Board facially adopted the district court's construction of "grid point," it found that this construction does not require the claimed grid points to be "generated based on the measured calibration data." *Id*. at 27-28. As explained further below, however, this is required by the district court's construction of the term and, in particular, the phrase "representative calibration data for an area" used in the construction. *Infra* § VI.A; Ex. 2020 ¶¶ 72-82.

To the extent the Board disagrees with Patent Owner regarding what is required by the district court's construction, it should more precisely construe "non-uniform grid point" as "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." As discussed below, the intrinsic evidence supports this construction as it repeatedly makes clear that a fundamental aspect of the claimed non-uniform grid points is that they represent a particular area, within a broader region, that is determined by evaluation of the calibration data that has been previously gathered in that region. *Infra* § VI.B; Ex. 2020 ¶¶ 73-74, 83-91.

The Board construes claim terms using the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). The intrinsic evidence—including the claim language, specification, and prosecution history—is of primary importance in construing terms. *Id*. at 1314. The '358 Patent specification specifically incorporates the '379 Provisional by reference. Ex. 1001 at 1:10-15; *Trustees of Columbia Univ. in City of New York v. Symantec Corp.*, 811 F.3d 1359, 1365 (Fed. Cir. 2016) (relying on provisional application incorporated by reference in a patent specification to construe a term in the patent) (citing *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000)).

A. The District Court's Construction of "Grid Point" Requires Evaluation of Calibration Data to Determine the Boundaries of the Area Represented by a "Grid Point"

The district court construed "grid point" as "a point associated with representative calibration data for an area." Ex. 1028 at 18-20. In its *Markman* Order, the district court expanded on what this construction means in the context of the '358 Patent and related patents that use the same term.

The district court adopted the phrase "representative calibration data for an area" in its construction of "grid point" to "reflect that ***the defining characteristic of a NUG region***—as explained in the specifications of the '753 Patent, '104 Patent, and ['784] Patent—***is that the data points within an area are all 'statistically very similar'*** such that each of the grid points within the NUG region can represent the

overall NUG." Ex. 1028 at 20 (emphasis added) (citing Ex. 1018 at 3:56-60; Ex. 1008 at 10:29-11:7; Ex. 1007 at 6:22-28). Thus, the district court explained that the phrase "representative calibration data for an area" in its construction means that the calibration data associated with a grid point are "statistically very similar" such that the calibration data are representative of the area encompassed by the grid point. Ex. 2020 ¶ 77. This is also how the '379 Provisional and the '753 Patent describe the claimed grid points.[3] Ex. 1005 at 6 (explaining how grid points are generated based on evaluation of whether clusters of calibration data are "statistically very similar" and identifying tests used to determine such "[s]tatistical similarity"); Ex. 1008 at 10:55-11:6 (same); Ex. 2020 ¶ 77. Because this is a "defining characteristic," the claimed grid points cannot exist until after the calibration data is gathered and analyzed.

[3] The '379 Provisional is incorporated by reference in the '358 Patent. Ex. 1001 at 1:10-15. Accordingly, the specification of the '358 Patent includes the disclosures in the '379 Provisional and such disclosures are intrinsic evidence. *See X2Y Attenuators, LLC v. Int'l Trade Comm'n*, 757 F.3d 1358, 1362-63 (Fed. Cir. 2014) (finding that incorporated material is "effectively part of" a host patent as if "explicitly contained therein").

Under the district court's construction, a "grid point" is not associated with generic calibration data. Ex. 2020 ¶ 78. Rather, a "grid point" must be associated with calibration data that is ***representative for an area***. Ex. 2020 ¶ 78. This requires that the boundaries of the area represented by a given grid point be determined by evaluating the calibration data so that the subset of data associated with that grid point is representative of that area. Ex. 2020 ¶ 78. The '379 Provisional—which is incorporated by reference in the '358 Patent (Ex. 1001 at 1:10-14)—and the related '753 Patent describe this as involving the evaluation of statistical similarities across the set of calibration data gathered within a region, and teach examples of the statistical analyses used to generate the claimed grid points from this calibration data. Ex. 1005 at 6 ("If the aggregated cluster . . . is statistically very similar to either of the first or second clusters . . . then the data for the two calibration points may be allocated to the same NUG"), 7 ("The NUGs may fully cover the region R and each NUG has statistically similar data accumulated into itself"); Ex. 1008 at 10:39-65, 12:4-14; Ex. 2020 ¶ 79. Similarly, the '379 Provisional and '753 Patent teach examples of the statistical analyses used to generate the claimed grid points from this calibration data. Ex. 1005 at 6; Ex. 1008 at 10:66-11:6; Ex. 2020 ¶ 79. There is no dispute that what may constitute representative calibration data for an area is a subset of the calibration data that is collected through a broader region. Ex. 2023 at 35:11-36:2, 42:10-45:9; Ex. 2020 ¶ 78; *see also* Ex. 1007 at Fig. 6, 6:21-34

(depicting geographical region (R), where calibration data is collected, divided into different areas each associated with a different grid point (NUG1, NUG2, and NUG3)); Ex. 1001 at 3:57-67 (describing same).

Thus, the district court's construction implicitly requires evaluating the calibration data to determine the boundaries of the area represented by a grid point so that "representative calibration data for [the] area" can be associated with it. Ex. 2020 ¶ 80. If the calibration data is not evaluated, the "representative calibration data for an area" cannot be defined, and thus cannot be associated with a point. Ex. 2020 ¶ 80. Consequently, interpreting the term "grid point" in a vacuum without this requirement renders the "representative … for an area" portion of the district court's construction meaningless and superfluous.

The district court also stated that the '753 Patent's explanation that "calibration data for a number of locations" is "gathered and analyzed so that particular grid points within the geographic region can be determined and associated with a particular set or sets of calibration data" demonstrates "what *must be done* to arrive at a grid point or set of grid points." Ex. 1028 at 19 (quoting '753 Patent at Abstract) (emphasis in original). This further demonstrates the district court's recognition that generating a grid point involves evaluating calibration data, as reflected in its use of the phrase "representative calibration data for an area" in its adopted construction. Ex. 2020 ¶ 81.

The Institution Decision found that this language "was explaining why the cited language was not pertinent to the meaning of 'grid point;' it was not indicating that grid points must be generated based on the measured calibration data." D.I. at 27. But this overlooks both the plain language and reasoning of the district court as well as the teachings of the intrinsic evidence. How the claimed grid points are generated is fundamental to what they are—they must be generated based on evaluation of the calibration data so that they are representative of a particular area. Ex. 2020 ¶ 82. Indeed, the boundaries of the area represented by a given grid point—and thus, the shape of that area—are not defined until the calibration data is evaluated. Ex. 1005 at 7 ("The ***geometrical shape*** and the amount of data accumulated into such NUGs ***is seen to be variable since these are determined by the statistical similarity of the [calibration] data allocated to a NUG***.") (emphasis added); Ex. 2020 ¶ 82. The intrinsic evidence confirms that how the claimed grid points are generated is an essential characteristic of what they are. *See infra* § VI.B. For example, the '379 Provisional extensively describes the generation of grid points, explaining that "[t]he evaluation of data vectors is of great importance since it is fundamental to the method." Ex. 1005 at 6; Ex. 2020 ¶ 82. Similarly, the related '753 Patent describes in detail how grid points are generated so that they can serve their purpose of representing a given area. Ex. 1008 at 10:39-11:6, 12:4-14; Ex. 2020 ¶ 82.

For these reasons, the district court's construction of "grid point," which Petitioner has proposed and the Board adopted for purposes of institution, requires that a grid point—including the boundaries of the area represented by that grid point—be determined from evaluation of calibration data. Thus, the "non-uniform grid points" claimed in the '358 Patent have this same requirement.[4] As explained further below, this requirement is also supported by the intrinsic evidence. *Infra* § VI.B.

B. In the Alternative, the Board Should Adopt a Construction of "Non-Uniform Grid Point" that is Supported by the Intrinsic Evidence

For the reasons set forth above, the district court's construction of "grid point" necessarily requires that the calibration data be evaluated to determine the boundaries of the area represented by a "grid point" so "representative calibration data for [the] area" can be associated with the "grid point." *Supra* § VI.A. And this requirement is similarly applicable to "non-uniform grid points." *Id*.

To the extent the Board views the district court's construction as vague as to this point, the intrinsic record requires the term "non-uniform grid point" to be

[4] The Board previously construed "non-uniform grid points" as "grid points that are non-uniformly spaced throughout a geographic region," recognizing that "non-uniform grid points" incorporate the requirements of "grid points." D.I. at 25.

construed as "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data."

The claim language requires this construction. The use of the claim term "non-uniform" means that the area covered by each grid point is not uniform—*i.e.*, the boundaries of the non-uniform grid points are different. Ex. 1001 at cl. 18; Ex. 2020 ¶ 85. Further, claim 18 requires that the "[calibration] database" comprises "previously-gathered calibration data for one or more non-uniform grid points within said region." Ex. 1001 at cl. 18. Thus, the claim requires assigning the calibration data gathered over a "predetermined region" to "one or more non-uniform" grid points. Ex. 1001 at cls. 15, 18; Ex. 2020 ¶ 85.

The specification also requires Patent Owner's proposed construction of "non-uniform grid point." Ex. 2020 ¶¶ 86-91. The '358 Patent explains that a "non-uniform grid point (NUG) may represent the signal characteristics and/or calibration data over a given region" such that each NUG "represent[s] an area of collected calibration data." Ex. 1001 at 3:57-67; Ex. 2020 ¶ 86. The boundaries of the area represented by a non-uniform grid point—which define the shape of that area—are variable because they are based on evaluation of statistical similarities across the gathered calibration data. Ex. 2020 ¶ 86. The '379 Provisional explains this fundamental aspect of the claimed non-uniform grid points (or NUGs):

> The NUGs fully cover the region R and each NUG has statistically similar data accumulated into itself. ***The geometrical shape and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG.***

Ex. 1005 at 7 (emphasis added); *see also* Ex. 1001 at 1:10-14 (stating that the '379 Provisional is "incorporated by reference in its entirety" in the '358 Patent); Ex. 2020 ¶ 86.

The related '753 Patent also describes this critical aspect of the claimed non-uniform grid points (or NUGs):

> The NUGs may fully cover the region R and each NUG may have statistically similar data accumulated into itself. ***The geometrical shape (i.e., the shape defined by the union of locations of calibration points assigned to the NUG) and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG***.

Ex. 1008 at 12:7-14 (emphasis added); Ex. 2020 ¶ 86.

NUGs are depicted in Figure 6 of the related '784 Patent, which shows "a geographical region (R) having NUGs represented by NUG1, NUG2, and NUG3."

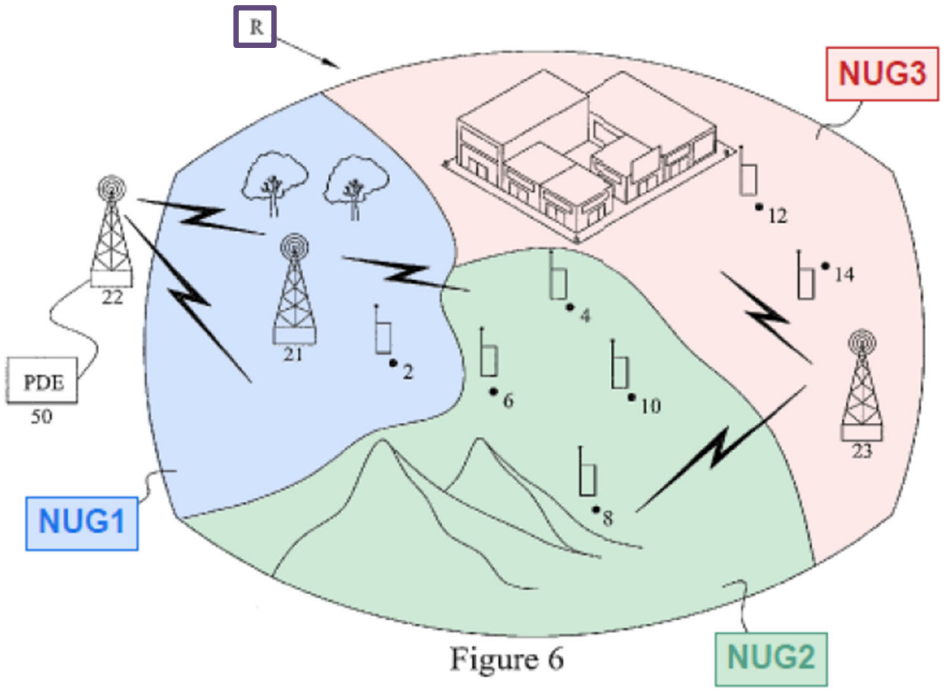

Figure 6

Ex. 1007 at Fig. 6 (annotated to show each NUG in geographical region R in a different color), 6:21-34; Ex. 2020 ¶ 87.

As shown in the annotated figure, each NUG corresponds to an area that is part of a broader region (R). Ex. 1007 at Fig. 6; Ex. 2020 ¶ 88; *see also supra* § III.A (further describing the claimed grid points of the '358 Patent). Calibration data is gathered at different locations in this broader region and then analyzed to define grid points that divide the region into different areas represented by each grid point. Ex. 1008 at 2:31-35 ("The calibration data for these locations [within a geographic region] 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."); Ex. 2020 ¶ 88.

Because non-uniform grid points "represent an area of collected calibration data" (Ex. 1001 at 3:63-67)—and thus are associated with representative calibration data for an area—the boundaries of this area must be defined. Rather than these boundaries being predefined without consideration of the calibration data, the boundaries are determined based on evaluation of the calibration data. Ex. 1005 at 7 ("The geometrical shape and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG."); Ex. 2020 ¶ 86; *see also supra* § III.A. This allows the size and shape of each non-uniform grid point to be tailored to the broader region where the calibration data is collected so that the region can be divided into areas represented by such grid points.

The specification similarly describes the evaluation of calibration data that occurs to generate a non-uniform grid point. The '379 Provisional first makes clear that "[t]he evaluation of the [calibration] data vectors is of great importance since it is fundamental to the method" of generating the claimed grid points. Ex. 1005 at 6; *see also* Ex. 1001 at 1:10-14; Ex. 2020 ¶ 89. The '379 Provisional further explains that the data is evaluated "using increasingly stringent tests of statistical sufficiency." Ex. 1005 at 6; *see also* Ex. 1001 at 1:10-14; Ex. 2020 ¶ 89. The "[s]tatistical similarity" of the gathered calibration data is evaluated to generate a grid point, which includes defining the area it represents and associating it with

calibration data that is representative of that area. Ex. 1005 at 6-7; *see also* Ex. 1001 at 1:10-14; Ex. 2020 ¶ 89. Multiple methods of evaluating statistical similarities across the calibration data may be used to allocate calibration data to different grid points. Ex. 1005 at 6 (referring to "clustering tests" and "K-means algorithm"); *see also* Ex. 1001 at 1:10-14. For example, calibration data is evaluated to is evaluated to determine whether it "exhibit[s] clustering." Ex. 1005 at 6; Ex. 2020 ¶ 89. Clusters of data collected at different "calibration points" that are determined, based on this evaluation, to be "statistically very similar" are allocated to the same grid point while clusters of data that are "sufficiently different" are allocated to different grid points. Ex. 1005 at 6; *see also* Ex. 1001 at 1:10-14; Ex. 2020 ¶ 89.

The result of this evaluation and allocation of data to each non-uniform grid point is that each has "statistically similar data accumulated into itself"—*i.e.*, each claimed grid point is associated with representative calibration data for an area. Ex. 1005 at 7; *see also* Ex. 1001 at 1:10-14; Ex. 2020 ¶ 90. Additionally, the allocation of subsets of calibration data collected at various locations within a region to different non-uniform grid points defines the areas represented by each grid point. Ex. 2020 ¶ 90. Consequently, the "geometrical shape" (*i.e.*, boundaries) of the area represented by a particular non-uniform grid point is "determined by the statistical similarity of the data" allocated to a grid point, which is based on evaluation of the calibration data. Ex. 1005 at 7; *see also* Ex. 1001 at 1:10-14; Ex. 2020 ¶ 90. The

related ’753 Patent reiterates this as well. Ex. 1008 at 10:66-11:6, 12:7-14; Ex. 2020 ¶ 90.

For these reasons, one of skill in the art (*see supra* § VI) would understand, in view of the intrinsic evidence, that the term “non-uniform grid point” as used in the ’358 Patent means “a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data.” Ex. 2020 ¶ 91. As explained above, the district court’s construction of “grid point” requires that the boundaries of the area represented by a grid point be determined from evaluation of the calibration data. *Supra* § VI.A. Nonetheless, if the Board concludes otherwise, it should adopt this proposed construction for “non-uniform grid point.”

VII. PETITIONER FAILS TO MEET ITS BURDEN TO PROVE THAT CLAIM 18 IS UNPATENTABLE

Claim 18 of the ’358 Patent, which depends from Claim 15, further recites “wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.” Ex. 1001 at cl. 18. Petitioner fails to meet its burden to show that claim 18 is unpatentable under the proper construction of the term “grid point,” or “non-uniform grid point,” used in this claim.[5] *See supra* § IV. Specifically, Petitioner fails to show that Shkedi or Zhu

[5] As noted above, Patent Owner only addresses the patentability of claim 18 herein as the remaining challenged claims have been disclaimed. *See supra* § I.

anticipates or, each in view of Spain, renders obvious claim 18 of the ’358 Patent. Further, Petitioner fails to show that the combinations of Zhu and Laitinen or Zhu, Laitinen, and Spain render obvious claim 18 of the ’358 Patent.

A. Ground 1: Claim 18 Is Not Anticipated by Shkedi

1. Petitioner Fails to Show that Claim 18 is Anticipated by Shkedi

Petitioner argues that Shkedi discloses “‘Registering’ and ‘Recording’ non-uniform locations of a mobile telephone as signal strength measurements in a database” and “updating that database with measurements made during ‘Monitoring’ of the mobile telephone’s location.” Pet. at 32 (citing Ex. 1006 at 5:36-63, 11:51-12:5, 14:1-7). However, the locations referred to in these steps of Shkedi are merely predetermined locations where measurements (*i.e.*, calibration data) are collected. Ex. 2020 ¶ 95. The “Registration” step is “a ***data collection*** step where the portable device comes to measure the antenna signal space reception characteristics at the selected location” while the “Monitoring” step is a second ***data collection*** step “alike in technical detail to the Registering step” from which the location of the mobile communications device can be determined by comparison to the measurements collected at the “Registration” step and recorded in the “Recording” step. Ex. 1006 at 11:18-28, 11:51-65, 12:6-11 (emphasis added); Ex. 2020 ¶ 95. Nonetheless, Petitioner argues that these locations where calibration data is collected constitute “non-uniform grid points.” Pet. at 32-33.

As explained above, the term "grid point" (or "non-uniform grid point") used in claim 18 is not a predetermined location where an individual data measurement has been made, like Shkedi. Ex. 2020 ¶ 96 The claimed grid points have specific requirements, including that the boundaries of the area represented by the grid point are determined from evaluation of the calibration data. Ex. 2020 ¶ 96; *supra* § VI. Under this proper construction, Shkedi has no teaching or suggestion of a "database compris[ing] previously-gathered calibration data for one or more non-uniform grid points." Ex. 1001 at cl. 18; Ex. 2020 ¶ 96.

Petitioner states that Shkedi discloses "[n]on-uniform user locations" that are allegedly points "associated with representative calibration data for an area [*e.g.*, within a predetermined proximity]."[6] Pet. at 33 (citing Ex. 1006 at 8:44-48).

[6] Petitioner argues that Shkedi allegedly discloses a "database of non-uniform grid points" that is "built from (1) extrapolation of collected 'correspondence data' and/or (2) measuring of signal strengths to "fill in the map" (EX1016, ¶61) with non-uniform locations," referencing Patent Owner's complaint. Pet. at 34. The proper inquiry is not comparing Shkedi to erroneous characterizations of Patent Owner's complaint, but rather comparing the disclosures of Shkedi to the claim language, as construed. *TI Grp. Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C.*, 375 F.3d 1126, 1139 (Fed. Cir. 2004) ("The first step involves the proper interpretation of the

Petitioner's "predetermined proximity" argument fails because it does not demonstrate that Shkedi's "user selected location[s]" stored in a database represent an area, much less one whose boundaries are determined from evaluation of the calibration data. Ex. 2020 ¶¶ 96-97. Shkedi's discussion of "predetermined proximity" is an assumption about where a mobile device is based on comparing data from the "Monitoring" step to data from the "Registering" step. Ex. 1006 at 5:44-58, 8:41-56; Ex. 2020 ¶ 97. That is, Shkedi assumes that a signal collected while "Monitoring" is within a certain distance from a signal with similar characteristics collected during "Registering." Ex. 1006 at 8:41-56, 11:18-37 (describing "Registering"), 11:51-12:5 (describing "Monitoring"); Ex. 2020 ¶ 97. This location is not a non-uniform grid point because it does not represent an area and it is not generated based on evaluation of the measured calibration data. Ex. 2020 ¶ 97.

To explain further, Shkedi merely discloses that when signals are observed during the "Monitoring" step, a user can "conclude that it is within a predetermined

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claims. The second step involves determining whether the limitations of the claims as properly interpreted are met by the prior art."); *Deere & Co. v. Gramm*, 842 F. App'x 628, 632 (Fed. Cir. 2021). Thus, Petitioner's reliance on Patent Owner's complaint is irrelevant and misplaced.

proximity" of a prior stored location based on the similarity of the signal strength measurements. Ex. 1008 at 8:41-48; Ex. 2020 ¶ 98. But a stored "user selected location" of Shkedi is not associated with a given area based on a "predetermined proximity." Ex. 2020 ¶ 98. Rather, this only means that Shkedi assumes the user is within some "predetermined" distance of that location depending on the measurements observed at that time. Ex. 2020 ¶ 98. The determination depends on whether a mobile device is able to "observ[e] an identical list of service antennas with substantially identical respective signal strengths," and thus will differ based on environmental conditions, mobile device conditions, and any other factors that impact the data observed by a device at the time it is determining its location (as opposed to the previously-stored calibration data). Ex. 1008 at 8:41-48; Ex. 2020 ¶ 98. Thus, no area represented by a given "user stored location" can be defined. Ex. 2020 ¶ 98. Even if such an area could be defined, its boundaries would not be determined from evaluation of the calibration data. Ex. 2020 ¶ 98.

This is in stark contrast to the non-uniform grid points of the '358 Patent which have a defined area that they represent when they are generated, as seen in Figure 6 of the related '784 Patent. Ex. 1007 at Fig. 6; Ex. 2020 ¶ 99; *see also supra* §§ III.A, VI. Although observed data measurements may also be affected by environmental factors and the like, the area represented by a non-uniform grid point has already been defined based on evaluation of previously-gathered calibration

data. Ex. 2020 ¶ 100. Thus, unlike Shkedi, the area represented by a non-uniform grid point in the '358 Patent exists and is specifically defined regardless of what data is observed at the time a user is seeking its location.[7] Ex. 2020 ¶ 100. And this is necessary as the "grid point" must represent the calibration data in that particular area—if the boundaries are not defined, it cannot do so. Ex. 2020 ¶ 100; *supra* § III.A.

For these reasons, Shkedi does not disclose or teach the use of any "point[s] associated with representative calibration data for an area," let alone any "point[s] associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." Ex. 2020 ¶ 101; *see supra* § VI. Accordingly, Shkedi does not disclose "non-uniform grid points," as required by claim 18 of the '358 Patent. Ex. 2020 ¶ 101. Notably, Petitioner identifies nothing in Shkedi teaching evaluating the statistical similarity, or any other commonality, in the stored calibration data, despite that being a fundamental aspect of the "grid points" disclosed in the '358 Patent. *See supra* § III.A.

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[7] "Observed data" refers to the data collected by a mobile device at the time it is determining its location. *See* Ex. 1001 at 9:51-64. "Calibration data" refers to previously-gathered data that is stored in a database prior to a mobile device determining its location at a particular moment. *Id*.

2. Institution Decision

In its Institution Decision, the Board preliminarily found that Patent Owner introduced requirements into the term "grid point" that are not part of the construction of the term. D.I. at 26-27. Patent Owner has further addressed the district court's construction of "grid point" to clarify that "grid points," including the boundaries of the areas the represent, must be generated based on evaluation of the calibration data. *Supra* § VI.A. Patent Owner has also proposed a more precise construction of "non-uniform grid point" that is supported by the intrinsic record. *Supra* § VI.B.

Further, even if the Board rejects Patent Owner's claim construction arguments, Petitioner's argument still fails because it conflates "calibration points" and "grid points" in the '358 Patent claims. Ex. 2020 ¶ 102. Put simply, Shkedi's locations where measurements are made for registration in a database are akin to what the '358 Patent calls "calibration points," not "grid points." Ex. 2020 ¶ 102. Calibration points are discrete measurement points (*i.e.*, a mobile transmitter transmits a signal strength from a known location). Ex. 1005 at 5; Ex. 2020 ¶ 103. "Grid points," on the other hand, are generated by aggregating calibration vectors at each calibration point into defined geographic areas consisting of a number of similar vectors. Ex. 1005 at 6; Ex. 2020 ¶ 103.

Indeed, the ’358 Patent claims explicitly differentiate locations where calibration data is collected from the “non-uniform grid points”—the former are referred to as “calibration points.” *See* Ex. 1001 at cl. 27 (“The system of claim 15 wherein said previously-gathered calibration data includes ***calibration data gathered at a predetermined calibration point*** within said region wherein said predetermined calibration point is not located within a structure.”) (emphasis added); Ex. 2020 ¶ 102.

The ’379 Provisional incorporated into the ’358 Patent confirms this same distinction between “calibration points” and “non-uniform grid points.” Ex. 2020 ¶ 103. For example, the ’379 Provisional explains that calibration data is “obtained at each discrete point (***calibration point***)” within a region and that “[t]he calibration data could consist of many such sets (vectors) ***obtained at each calibration point***.” Ex. 1005 at 5-6 (emphasis added); *see also* Ex. 1001 at 1:10-14. In contrast, the ’379 Provisional explains that “non-uniform grid points” are “generat[ed]” based on “evaluation of the [calibration] data vectors” and that this evaluation “is of great importance since it is fundamental to the method.” Ex. 1005 at 6 (describing the operation of a “NUG generator”); *see also* Ex. 1001 at 1:10-14.

Thus, “calibration points” and “grid points” are two different claim terms with different meanings, particularly in view of the ’379 Provisional’s disclosures confirming that distinction. *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527

F.3d 1379, 1382 (Fed. Cir. 2008) ("Our precedent instructs that different claim terms are presumed to have different meanings."); *SIPCO, LLC v. Emerson Elec. Co.*, 794 F. App'x 946, 949 (Fed. Cir. 2019) ("Because the patentee chose to use different terms … we presume that those two terms have different meanings."). The intrinsic evidence confirms that "calibration points" are locations where calibration data is collected (Ex. 1005 at 5-6; Ex. 1001 at cl. 27) and Petitioner admits that the disclosures it relies on from Shkedi are similarly directed to locations where measurement data is collected (Pet. at 32-33 (relying on Shkedi's disclosure of storing in a database locations where "'a plurality of service antenna signals' (*i.e.*, signal strengths)" are measured)). Ex. 2020 ¶ 103. At best, Petitioner shows that Shkedi teaches non-uniform ***calibration points***—*i.e.*, non-uniform locations where calibration data is collected. *See* Pet. at 32-33. But claim 18 requires non-uniform ***grid points***. Accordingly, Petitioner's argument improperly erases the distinction between "calibration points" and "grid points," and should be rejected.

Petitioner also relies on language in Shkedi regarding "collecting correspondences between GPS (latitude longitude) coordinates and antenna space reception 'coordinates' for the same location" to create a "transformational data bank," which can in turn, be used to find "a never registered location" by "grabbing antenna space reception 'coordinates' and extrapolating them within the correspondence set" as disclosing "non-uniform grid points." Ex. 1006 at 13:9-25;

see Pet. at 33. Specifically, Petitioner contends—without explanation—that the extrapolated locations "constitute non-uniform grid points that are used to 'build' Shkedi's database for location determination." Pet. at 33. Shkedi contains virtually no description of a purported "transformational data bank" and "antenna space reception 'coordinates,'" and Shkedi makes clear its discussion of these concepts is aspirational. *See* Ex. 1006 at 13:9-25 ("This aspect ***anticipates*** that a transformational data bank ***could be created*** …") (emphasis added).

Nonetheless, to the extent this constitutes a teaching, it involves no more than using "extrapolation" of measured data to estimate a user's location ***as opposed to a location that is stored in Shkedi's database***. Ex. 1006 at 13:9-25; Ex. 2020 ¶ 105. The "extrapolated" location that Shkedi refers to is explicitly a "never registered location," meaning a location that has ***not*** been stored in the database. Ex. 1006 at 13:18-21; *see also id*. at 5:44-49 (describing Shkedi's "Registering" process); Ex. 2020 ¶ 105. Thus, this is not a disclosure of "non-uniform grid points" in a database that are then used to determine a user's location, as Shkedi expressly teaches that these are locations that are "never registered"—*i.e.*, not stored in Shkedi's database. Ex. 2020 ¶ 105.

In the Institution Decision, the Board preliminarily found that such locations can constitute "random locations, thereby supporting Petitioner's assertion that they represent non-uniform grid points." D.I. at 28-29. Claim 18, however, requires a

database to comprise previously-gathered calibration data for the non-uniform grid points. Ex. 1001 at cl. 18. Thus, the issue is not whether these "never registered" locations are "random," but rather whether they are stored in a database. Shkedi teaches that they are not by describing them as "never registered locations," as opposed to other locations stored in the database during the "Registering" and "Recording" steps. Ex. 1006 at 5:44-53, 11:18-50; Ex. 2020 ¶ 105.

For the foregoing reasons, Petitioner fails to show that Shkedi anticipates claim 18 of the '358 Patent.

B. Ground 2: Petitioner Fails to Show that Claim 18 Is Obvious Over Shkedi in View of Spain

Petitioner's argument fails because Shkedi does not teach or disclose "non-uniform grid points" as that term is used in the '358 Patent (*supra* § VII.A) and neither does Spain. Petitioner relies on Spain's description of how a fingerprint database "is built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints at all locations between the sampled locations" as disclosing this limitation.[8] Pet. at 35-36 (citing Ex. 1009

[8] Petitioner again relies on statements about how Patent Owner has allegedly "defined 'non-uniform grid points to encompass 'interpolated' grid points," referencing Patent Owner's complaint. Pet. at 34-35 (citing Ex. 1016). Not only are these statements incorrect to the extent they suggest that Patent Owner has defined

at [0101] and [0054]-[0055]). Contrary to Petitioner's assertion, this disclosure confirms a key distinction between the interpolated fingerprints of Spain and the claimed "non-uniform grid points."

The claimed grid points of the '358 Patent are associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data. Ex. 2020 ¶ 109; *supra* § VI. In Spain, however, the interpolated fingerprints are used to fill in missing fingerprint measurements at predetermined locations—*i.e.*, locations that are defined in advance independently of any calibration data. Ex. 2020 ¶ 109. Although these fingerprints may correspond to a "small area" surrounding a predetermined location, Spain does not teach how this area is defined or how its boundaries are determined. *See* Ex. 1009 at [0099]-[0101]; Ex. 2020 ¶ 110. Thus, Spain does not teach or suggest that the boundaries of this "small area" are based on evaluation of calibration data. *See* Ex. 1006 at [0099]-[0101]; Ex. 2020 ¶ 110. Indeed, the context of Spain, in which fingerprints are associated with predetermined locations, suggests that the areas corresponding to a

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"grid points" contrary to the proposed construction (*see supra* § VI), but they are also irrelevant because a proper invalidity inquiry must compare the disclosures of the prior art to the claims as construed, not characterizations of Patent Owner's complaint. *See supra* § VII.A n.6.

fingerprint—and the boundaries of such areas—are also predetermined, and thus independent of any evaluation of calibration data. Ex. 2020 ¶¶ 109-111.

For example, Spain describes "interpolat[ing] the fingerprints at ***all locations*** in between the sampled locations" to reduce the number of physical measurements to be made to populate the fingerprint database. Ex. 1009 at [0101] (emphasis added). That this interpolation occurs at "all locations" confirms that it is for the purpose of filling in fingerprint measurements for predetermined locations. Ex. 2020 ¶ 109. Interpolating fingerprints for "all locations" is meaningless unless those locations have already been determined and defined; "all" refers to the entire set of locations, requiring the set of locations to be defined in advance. Ex. 2020 ¶ 109.

Especially given Spain's lack of disclosure to the contrary, a POSITA would understand Spain's embodiment in which fingerprints may correspond to a "small area" (instead of "one exact spot" identified by a particular latitude and longitude) to similarly use predetermined areas that are defined without any evaluation of calibration data. Ex. 1009 at [0099]-[0101]; Ex. 2020 ¶¶ 110-111. That the "small area" is identified by a particular predetermined location represented in the "Lat and Long fields" further confirms that the boundaries of the "small area[s]" described by Spain are not determined from evaluation of calibration data, but rather are predetermined without any consideration of the calibration data. Ex. 1009 at [0099], Fig. 10; Ex. 2020 ¶ 111. Moreover, nothing in Spain indicates the "small areas" are

non-uniform or have different shapes or sizes. Ex. 2020 ¶ 111. Indeed, Figure 10 (which paragraph [0099] is describing) does not have a field for indicating shape or size of the "small area." Ex. 1009 at Fig. 10; Ex. 2020 ¶ 111. Additionally, Petitioner identifies nothing in Spain teaching evaluating the statistical similarity, or any other commonality, in the stored calibration data, despite that being a fundamental aspect of how "grid points" are described in the '358 Patent. *See supra* § III.A.

Further, Petitioner's argument fails because it does not provide ***any*** substantive analysis for its asserted combination of Shkedi in view of Spain. For obviousness, Petitioner has the burden of establishing that a POSITA would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that they would have had a reasonable expectation of success in doing so. *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1347 (Fed. Cir. 2014).

Petitioner provides no explanation as to ***how*** Shkedi would be modified in view of Spain to achieve the claimed invention apart from stating that a POSITA would "include [Spain's] points in Shkedi's database." Pet. at 34. At most, this is an unsupported conclusion that fails to explain how a POSITA would make this purported modification. As to motivation to combine, Petitioner argues that both references "seek to improve accuracy in mobile unit location determination using 'fingerprinting' techniques" and "are directed to improving location accuracy in

areas with degraded GPS capability." Pet. at 36. As generic arguments that the references are directed to the same general field or same problem provide a motivation to combine do not suffice, Petitioner's obviousness argument fails. *Securus Techs., Inc. v. Glob. Tel*Link Corp.*, 701 F. App'x 971, 976-77 (Fed. Cir. 2017).

Petitioner also makes boilerplate assertions that the combination "would have been a routine addition" and "an obvious way to build the database in exactly the manner contemplated by Shkedi." Pet. at 36. These generic contentions largely parrot legal standards applicable to finding a motivation to combine and reasonable expectation of success, with no specificity or explanation. Thus, these arguments fail as well. *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) ("To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness"); *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012) (finding generic motivations to combine insufficient).

Accordingly, neither Spain nor Shkedi (*see supra* § VII.A) disclose "non-uniform grid points," as required by claim 18 of the '358 Patent, nor does Petitioner meet its burden to show that a POSITA would combine Spain's fingerprint database

with Shkedi. Thus, Petitioner fails to show that the combination of Shkedi and Spain renders obvious claim 18 of the ’358 Patent.

C. Ground 3: Petitioner Fails to Show that Claim 18 Is Anticipated by Zhu

Zhu does not teach or suggest all the limitations of Claim 18 of the ’358 Patent; in particular, it fails to teach a database “compris[ing] previously-gathered calibration data for one or more non-uniform grid points.”

First, Petitioner contends that Zhu’s “measured points” constitute “non-uniform grid points” because they “tend to cluster along paths due to the walking or driving methods of collection”—and thus, may not be non-uniformly distributed relative to each other. Pet. at 46. But these “measured points” are locations where calibration data is ***collected***, which is why they “cluster” due to the “method[] of collection.” Ex. 1010 at 94; Ex. 2020 ¶ 114. As explained above, locations where calibration data is collected are referred to in the ’358 Patent as “calibration points,” and the claims expressly distinguish “calibration points” from “non-uniform grid points.” *See supra* § VII.A (explaining, in the context of Petitioner’s arguments regarding Shkedi, how the ’358 Patent claims and specification explicitly differentiate “calibration points” and “non-uniform grid points”); Ex. 2020 ¶ 114. Claim 18 of the ’358 Patent, however, requires “non-uniform grid points.” Thus, Petitioner’s argument improperly conflates two distinct claim terms that are

"presumed to have different meanings," and should be rejected. *Helmsderfer*, 527 F.3d at 1382; *SIPCO*, 794 F. App'x at 949; *supra* § VII.A.

Second, Petitioner primarily relies on Zhu's "local interpolation" and "modeling" as teaching "non-uniform grid points," without any explanation apart from asserting "Owner has defined 'non-uniform grid points' to encompass 'interpolated' grid points." Pet. at 47. As explained above, Petitioner's argument is based on erroneous characterizations of Patent Owner's complaint for patent litigation that are not relevant to the proper inquiry at hand, which is based on comparing the disclosures of Zhu to the claim language, as construed. *Supra* § VII.A n.6.

Third, neither Zhu's measured locations nor modeled points satisfy the proper construction of "non-uniform grid points." Ex. 2020 ¶¶ 115-116. As explained above, the claimed grid points of the '358 Patent represent areas whose boundaries are determined from evaluation of calibration data. Ex. 2020 ¶ 115; *supra* § VI. Zhu, however, expressly teaches that its measured locations or modeled points correspond to predetermined areas in a raster array that are defined independently of any calibration data—*e.g.*, uniform 10m by 10m squares. Ex. 1010 at 93-94; Ex. 2020 ¶ 115. Thus, the boundaries of the "areas" of Zhu that Petitioner relies on are not determined from evaluation of calibration data. Ex. 2020 ¶ 115. This is readily apparent from the figures in Zhu, shown below, which demonstrate that data is

merely filled into a ***predefined and uniform grid***—the location and boundaries of squares in this grid are not determined from evaluation of any calibration data:

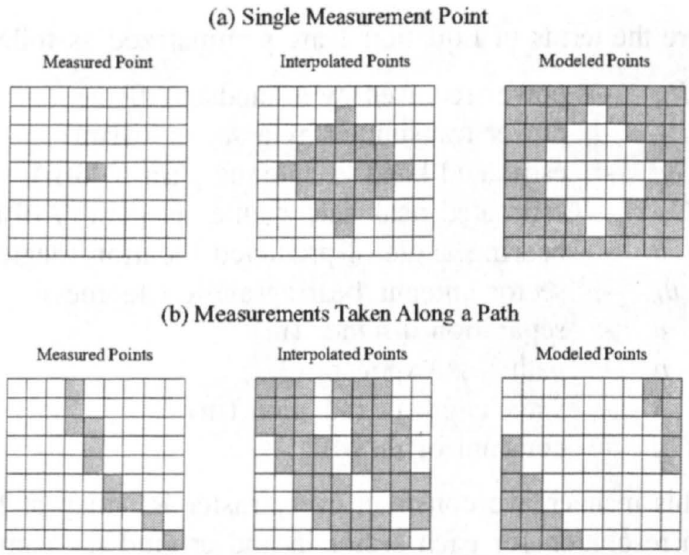

Fig. 2. Marked raster regions (in gray) for (a) a single measurement and (b) a path of measurements.

This is a critical distinction between the measured locations and modeled points of Zhu—which are part of a uniform, predetermined grid—and the claimed grid points of the '358 Patent, which are non-uniform and represent areas whose boundaries are determined from evaluation of calibration data. Ex. 2020 ¶ 116; *see supra* § VI. Additionally, Petitioner identifies nothing in Zhu teaching evaluating the statistical similarity, or any other commonality, in the stored calibration data, despite that being a fundamental aspect of how "grid points" are described in the '358 Patent. *See supra* § III.A.

For the foregoing reasons, Petitioner fails to show that Zhu anticipates claim 18 of the '358 Patent.

D. Ground 4: Petitioner Fails to Show that Claim 18 Is Obvious Over Zhu in View of Spain

Ground 4 relies on the same art found in Grounds 2 and 3, and fails for the same reasons as those grounds. As explained in §§ VII.B-C, neither Zhu nor Spain teach or disclose "non-uniform grid points." Further, like Ground 2, Petitioner's generic motivation to combine fails. Petitioner provides no explanation as to how Zhu would be modified in view of Spain to achieve the claimed invention apart from stating that a POSITA "would have been motivated to modify Zhu's system to include Spain's learning/interpolating technique to improve location accuracy of Zhu's fingerprint techniques by generating non-uniform grid points 'between grid points' . . . e.g., for 'all locations in between the sampled locations.'" Pet. at 54-55 (citations to Spain omitted). This is insufficient for Petitioner to meet its burden. *Magnum Oil Tools*, 829 F.3d at 1380; *ActiveVideo*, 694 F.3d at 1328. Accordingly, Ground 4 necessarily fails.[9]

VIII. CONCLUSION

For the foregoing reasons, Petitioner has failed to meet its burden to prove that claim 18 of the '358 Patent is unpatentable. Accordingly, the Board should confirm the patentability of claim 18.

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[9] Grounds 5 and 6 do not challenge claim 18 of the '358 Patent. Pet. at 6, 55, 57. Accordingly, Patent Owner does not address them in this response. *See supra* § I.

Respectfully submitted,

Dated: May 29, 2024

/Stephen McBride/

James T. Carmichael
Reg. No. 45,306
Lead Counsel for Patent Owner
Stephen McBride
Reg. No. 78,396
Minghui Yang
Reg. No. 71,989
CARMICHAEL IP, PLLC
8607 Westwood Center Drive
Suite 270
Tysons, VA 22182
jim@carmichaelip.com
stevemcbride@carmichaelip.com
mitch@carmichaelip.com
Tel: (703) 646-9255

Ryan J. Singer
Reg. No. 79,736
Christopher M. Gerson
Pro Hac Vice
Saunak K. Desai
Pro Hac Vice
Backup Counsel for Patent Owner
SCHULTE ROTH & ZABEL LLP
919 Third Avenue
New York, New York 10022
Tel: (212) 756-2000
Fax: (212) 593-5955
ryan.singer@srz.com
chris.gerson@srz.com
saunak.desai@srz.com

Counsel for Patent Owner
Geoscope Technologies Pte. Ltd.

CERTIFICATE OF COMPLIANCE

The undersigned certifies that this brief complies with the type-volume limitations of 37 CFR § 42.24(a)(1)(i). This brief contains 10,444 words as calculated by the "Word Count" feature of Microsoft Word, the word processing program used to create it. The undersigned further certifies that this brief complies with the typeface requirements of 37 CFR § 42.6(a)(2)(ii) and typestyle requirements of 37 CFR § 42.6(a)(2)(iii). This brief has been prepared in a proportionally spaced typeface using Microsoft Word in Times New Roman 14 point font.

Dated: May 29, 2024

/Stephen McBride/
James T. Carmichael
Reg. No. 45,306
Lead Counsel for Patent Owner
Stephen McBride
Reg. No. 78,396
Minghui Yang
Reg. No. 71,989
CARMICHAEL IP, PLLC
8607 Westwood Center Drive
Suite 270
Tysons, VA 22182
jim@carmichaelip.com
stevemcbride@carmichaelip.com
mitch@carmichaelip.com
Tel: (703) 646-9255

Ryan J. Singer
Reg. No. 79,736
Christopher M. Gerson
Pro Hac Vice
Saunak K. Desai
Pro Hac Vice

Backup Counsel for Patent Owner
SCHULTE ROTH & ZABEL LLP
919 Third Avenue
New York, New York 10022
Tel: (212) 756-2000
Fax: (212) 593-5955
ryan.singer@srz.com
chris.gerson@srz.com
saunak.desai@srz.com

Counsel for Patent Owner
Geoscope Technologies Pte. Ltd.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **Patent Owner's Response**, was served on May 29, 2024 via email directed to counsel of record for the Petitioner at the following address of record as listed on PTACTS:

Lead Counsel:
Patrick C. Keane, Esq.
Registration No. 32,858
BUCHANAN INGERSOLL & ROONEY PC
1737 King Street, Suite 500
Alexandria, Virginia 22314
Direct Telephone (703) 838-652 2
Main Facsimile (703) 836-2021
patrick.keane@bipc.com

Backup Counsel:
Roger H. Lee, Esq.
Registration No. 46,317
BUCHANAN INGERSOLL & ROONEY PC
1737 King Street, Suite 500
Alexandria, Virginia 22314
Direct Telephone (703) 838-6545
Main Facsimile (703) 836-2021
roger.lee@bipc.com

Backup Counsel:
Matthew L. Fedowitz, Esq.
Registration No. 61,386
BUCHANAN INGERSOLL & ROONEY PC
1700 K Street, NW, Suite 300
Washington, DC 20006
Direct Telephone (202) 452-7306
Main Facsimile (202) 452-7989
matthew.fedowitz@bipc.com

Backup Counsel:
Andrew R. Cheslock, Esq.
Registration No. 68,577
BUCHANAN INGERSOLL & ROONEY PC
1737 King Street, Suite 500
Alexandria, VA 22314
Direct Telephone (703) 838-6523
Main Facsimile (703) 836-2021
andrew.cheslock@bipc.com

Backup Counsel:
Mythili Markowski, Ph.D., Esq.
Registration No. 67,063
BUCHANAN INGERSOLL & ROONEY PC
1700 K Street, N.W., Suite 300
Washington, DC 20006
Direct Telephone (202) 452-7314
Main Facsimile (202) 452-7989
mythili.markowski@bipc.com

Backup Counsel:
Samuel Harrod, Esq.
Registration No. 79,148
BUCHANAN INGERSOLL & ROONEY PC
Union Trust Building,
501 Grant Street, Suite 200
Pittsburgh, PA 15219
Direct Telephone (412) 562-8805
Main Facsimile (412) 562-1041

samuel.harrod@bipc.com

Backup Counsel:
Ralph G. Fischer, Esq.
Registration No. 55,179
BUCHANAN INGERSOLL &
ROONEY PC
Union Trust Building
501 Grant Street, Suite 200
Pittsburgh, PA 15219
Direct Telephone (412) 392-2121
Main Facsimile (412) 562-1041
ralph.fischer@bipc.com

Dated: May 29, 2024

/Stephen McBride/

James T. Carmichael
Reg. No. 45,306
Lead Counsel for Patent Owner
Stephen McBride
Reg. No. 78,396
Minghui Yang
Reg. No. 71,989
CARMICHAEL IP, PLLC
8607 Westwood Center Drive
Suite 270
Tysons, VA 22182
jim@carmichaelip.com
stevemcbride@carmichaelip.com
mitch@carmichaelip.com
Tel: (703) 646-9255

Ryan J. Singer
Reg. No. 79,736
Christopher M. Gerson
Pro Hac Vice
Saunak K. Desai
Pro Hac Vice

Backup Counsel for Patent Owner
SCHULTE ROTH & ZABEL LLP
919 Third Avenue
New York, New York 10022
Tel: (212) 756-2000
Fax: (212) 593-5955
ryan.singer@srz.com
chris.gerson@srz.com
saunak.desai@srz.com

Counsel for Patent Owner
Geoscope Technologies Pte. Ltd.