

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.

Petitioner,

v.

GEOSCOPE TECHNOLOGIES PTE. LTD,

Patent Owner.

Case IPR2024-00255
U.S. Patent No. 7,561,104

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

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<i>TQ Delta, LLC v. Cisco Sys.</i> , 942 F.3d 1352 (Fed. Cir. 2019)	43, 53
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Exhibit No.	Patent Owner's Exhibits
2001	Declaration of Saunak K. Desai in Support of Patent Owner's Motion For <i>Pro Hac Vice</i> Admission of Saunak K. Desai Under 37 C.F.R. § 42.10(c)
2002	Reserved
2003	U.S. Patent No. 7,753,278 ("Spain '278 Patent")
2004 – 2007	Reserved
2008	Memorandum Opinion on Google's Motion for Judgment on the Pleadings on Patent Eligibility dated Sept. 18, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
2009	Final Judgment dated October 5, 2003, <i>Geoscope Technologies Pte. Ltd. v. Apple Inc.</i> , Civ. Action No. 1:22-cv-01373 (EDVA)
2010	Final Judgment dated October 6, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
2011	Order dated June 26, 2023, <i>Geoscope Technologies Pte. Ltd. v. Apple Inc.</i> , Civ. Action No. 1:22-cv-01373 (EDVA)
2012	Claim Construction Memorandum Opinion & Order, <i>Geoscope Technologies Pte. Ltd. v. Apple Inc.</i> , 1:22-cv-01373 (E.D. Va. Jul 19, 2023) ("Markman Order")
2013	Order dated June 26, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
2014	Defendant Apple Inc.'s Final Invalidity Contentions dated July 3, 2023, <i>Geoscope Technologies Pte. Ltd. v. Apple Inc.</i> , Civ. Action No. 1:22-cv-01373 (EDVA)
2015	Geoscope's Opening Appeal Brief dated November 17, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC, Apple Inc.</i> , Case Nos. 24-1003 (Lead) 24-1018 (member) (Fed. Cir.)
2016	U.S. Patent No. 8,406,753
2017	U.S. Patent No. 9,097,784
2018	Declaration of Mr. Mark Alan Sturza
2019	CV of Mr. Mark Alan Sturza

2020	Deposition Transcript of Dr. Karthikeyan Sundaresan for IPR2024-00031, IPR2024-00032, and IPR2024-00255
2021	U.S. Pat. No. 7,561,104 disclaimer
2022	Business News Daily, “Location-Based Services: Definitions and Examples,” Max Friedman, Oct. 27, 2023 (last accessed July 28, 2024) (“Business News Daily”).
2023	Dictionary.com, “Geolocation Definition & Meaning,” <i>available at</i> www.dictionary.com/browse/geolocation (last accessed July 16, 2024) (“Dictionary.com”).
2024	“Geolocation: What it is, How it Works, Examples”, January 25, 2021, <i>available at</i> https://www.investopedia.com/terms/g/geolocation.asp ; last accessed July 16, 2024 (“Investopedia”).
2025	“How Does GPS Work? 6 Things You Didn’t Know”, Calum McClelland, March 30, 2017, <i>available at</i> https://www.leverage.com/blogpost/how-does-gps-work-6-things-you-didnt-know , last accessed Aug. 7, 2024 (“Leverage”)
2026	U.S. Pat. Appl. Publ. No. 2003/0064735 (“Spain ’735”)
2027	U.S. Pat. No. 7,706,811 (“Shkedi”)
2028	Heikki Laitinen, Jaakko Lähteenmäki, Tero Nordström, “Database Correlation Method for GSM Location,” VTT Information Technology, IEEE, 2001. (“Laitinen”)
2029	U.S. Prov. Appl. No. 60/899,379 (“’379 Provisional”)
2030	U.S. Pat. No. 8,175,620 (“’620 Patent”)
2031	Applus, “Drive Test and Mobile Network Optimization,” <i>Available at</i> https://www.applus.com/global/en/what-we-do/service-sheet/drive-test-and-mobile-network-optimisation ; last accessed July 23, 2024 (“Applus”)
2032	Solomon Ndungu and Erica Mixon, “GSM (Global System for Mobile communication)”, <i>available at</i> https://www.techtarget.com/searchmobilecomputing/definition/GSM ; last accessed July 23, 2024 (“Techtarget”).
2033	<i>Excerpts from Telecom ABC</i> , <i>available at</i> https://www.telecomabc.com/i/is-41.html ; last accessed July 23, 2024 (“Telecom ABC”).
2034	Reserved

2035	Deposition Transcript of Dr. Karthikeyan Sundaresan for IPR2024-00259
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I. INTRODUCTION

U.S. Patent No. 7,561,104 (the “’104 Patent”) is directed towards a method to modify calibration data used to locate a mobile unit. EX1001 [’104 Patent], Title. Petitioner Apple Inc.’s (“Apple” or “Petitioner”) Petition challenges claims 1-3 and 6-11 of U.S. Patent No. 7,561,104 (“’104 Patent”). Patent Owner (“PO”) has filed a statutory disclaimer of claims 1, 3, and 11. EX2021 [’104 Patent Disclaimer]. Accordingly, this POR is directed to the remaining challenged claims 2, 4 and 6-10 of the ’104 Patent.

The Petition fails to meet its burden to prove the claims are unpatentable by a preponderance of the evidence because it has not addressed level of ordinary skill in the art. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966) (“Under § 103, ... the level of ordinary skill in the pertinent art [must be] resolved.”); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (“The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation.”). Instead, the Petition incorporates by reference a definition for level of ordinary skill from its expert declaration. 37 C.F.R. §42.6(a)(3). Even if such incorporation were permissible, the expert declaration is entitled to no weight because the expert does not provide an opinion on level of ordinary skill; instead, he parrots the

definition Petitioner's attorneys provided to him, stating he has "been informed" of the requisite level of ordinary skill. EX1003 [Sundaresan Decl.], ¶8.

Even accepting the definition of level of ordinary skill provided to Dr. Sundaresan, Petitioner's rationales for combining the references fail. A POSITA as defined by Petitioner's attorneys has experience "working with navigation and/or geolocation systems." *Id.* However, the '104 Patent and the asserted references are in the field of mobile telecommunications. EX1001 ['104 Patent], Title; EX1005 [Bhattacharya], [0001]; EX1006 [Zeng], 1; EX1007 [Spain], [0001]. While the fields of navigation and geolocation may overlap with mobile telecommunications, a person with experience in the fields of navigation and geolocation would not be expected to have knowledge of cellular standards and related concepts such as messaging and handoffs. Accordingly, the Board should find claims 2, 4 and 6-10 not unpatentable.

Finally, Petitioner has not shown that claim 2 is unpatentable under the proper construction for "[non-uniform] grid points." Under the proper construction, [non-uniform] grid points are created by evaluating calibration data (i.e., network measurement data) and aggregating similar areas of calibration data into non-uniform grid points. The Spain reference Petitioner relies on as allegedly disclosing non-uniform grid points creates regions via reference to physical

attributes such as streets or intersections rather than evaluation of calibration data.

Accordingly, the Board should find claim 2 not unpatentable.

II. OVERVIEW OF THE '104 PATENT AND THE STATE OF THE ART

A. Background of the Technology

The '104 Patent relates to the geolocation of mobile devices using RF signals and cellular technologies. EX2018 [Sturza Decl.], ¶51. Location-based services utilize geographic data to provide information to a user, or perform another function for a user, based on the user's location. EX2018 [Sturza Decl.], ¶51; EX2022 [Business News Daily]. Location-based services include, among other things, maps (e.g., pinpointing a user's current location or the location of another individual for applications such as a driver for a rideshare application), navigation (e.g., driving directions), local search (e.g., looking for nearby restaurants or providing relevant search results for requests with local intent), social networking, and targeted advertising. EX2018 [Sturza Decl.], ¶51. The '104 Patent's mention of "public safety groups" (EX1001 ['104 Patent], 1:17) indicates one possible application for emergency services.

Location-based services for mobile devices generally rely on the mobile devices being able to determine their location through a process called "geolocation." EX1001 ['104 Patent], 1:17-20. Geolocation is simply attempting to determine the location of a person or object. EX2023 [Dictionary.com]

(“Geolocation: The process of determining the location of an electronic devices, as a computer, cell phone, satellite, etc.”); EX2018 [Sturza Decl.], ¶52. As of February 2007 (the earliest effective filing date), there were many methods for geolocation. The best-known method was, and still is, GPS, but many other methods are available, including using IP addresses, Bluetooth, cell phone towers, and Wi-Fi access points. EX2018 [Sturza Decl.], ¶52; EX2024 [Investopedia].

At the time of the invention, there was a longstanding problem of providing high accuracy location data for mobile devices, such as mobile telephones. EX2018 [Sturza Decl.], ¶53. One way a mobile device can be geolocated is by using a GPS receiver. EX2024 [Investopedia]. This GPS-based location could then be transmitted to a base station or used locally on the device. However, GPS usually requires a line of sight between several GPS satellites and the mobile device. EX2025 [Leverage], 4-5. There are many situations (e.g., indoors) where GPS information may not be available or reliable. In those situations, the mobile device can still use other information to assist in determining the mobile device’s location. For example, RF signals (e.g., cellular signals) will, to an extent, propagate indoors. This allows the mobile device to identify nearby base stations and the strength of the signals received from each nearby base station. This information can be used to help determine location. EX2018 [Sturza Decl.], ¶53.

At the time of the invention, geolocation using RF signals (e.g., cellular data, as opposed to, for example, GPS information) was of interest in the field. EX2018 [Sturza Decl.], ¶54. Many methods attempted to use RF signals to geolocate mobile devices, but generally had problems, including limited accuracy. *See* EX2026 [Spain '753], [0003] (“A second solution is to compute the location of the mobile unit based on the cellular network signaling parameters This information is typically accurate to hundreds of meters.”); *see also* EX2027 [Shkedi], 1:39-57; EX2028 [Laitinen], 2504 (angle of arrival techniques are “expensive to implement” and “impractical in microcell sites” while existing GSM methods “do not allow highly accurate signal timing measurements.”). In general, a mobile phone monitors which cell site it is connected to, meaning that the mobile phone is usually somewhere near the active cell site, but accuracy might be on the order of several miles or more. EX2018 [Sturza Decl.], ¶54.

Some systems, like the '104 Patent, attempted to use cellular signals to provide more accurate geolocation. EX2018 [Sturza Decl.], ¶55. The '104 Patent relies on collecting “calibration data” from the relevant geographic region and saving this information into a “calibration database” where it is associated with a specific location. EX1001 ['104 Patent], 1:21-24, 1:36-40. Once the calibration data is available, mobile devices seeking their location can retrieve and use the

calibration data to determine their location. At a high level, a mobile device at an unknown location can “observe” and measure nearby network signals and compare that observed data to the previously-collected calibration data in a database to determine its location. When the measured data matches calibration data, that indicates the location of the mobile device. Various methods can be used for this comparison which involves comparing the calibration data and the observed data. EX2018 [Sturza Decl.], ¶55.

For example, drive testing is performed whereby mobile devices travel through a region and record information such as the received signal strength from various nearby base stations associated with specific coordinates (e.g., through simultaneous GPS measurements). This information is saved into the calibration database. Then, when a new mobile device passes through the region, it can “observe” data such as the received signal strength from nearby base stations and compare that observed data to the stored calibration data that is associated with coordinates. EX2018 [Sturza Decl.], ¶56. This allows the mobile device to determine its location even without GPS.

There are a number of reasons calibration data may not correspond to the data observed by a mobile device at the time it is seeking its location, even where the same base stations are involved. EX2018 [Sturza Decl.], ¶57. For example,

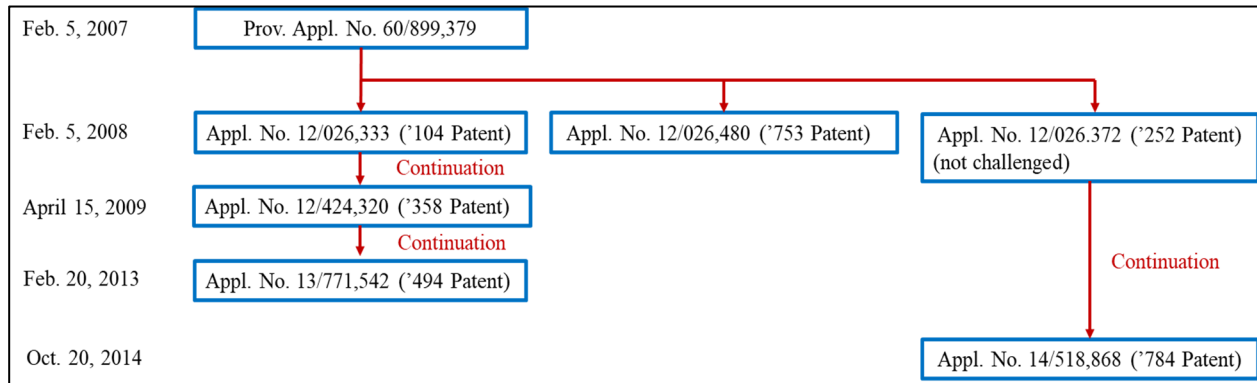
variations in the environment (e.g., weather) can affect the observed data. Clouds or precipitation can reduce signal strength. As another example, during summer months, foliage can interfere with signals. One potential reason for discrepancies is that the mobile device was indoors—where the signal is weaker—when it collected the observed data.

B. The '104 Patent

The '104 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). EX1001, 1:46-54; EX2018 [Sturza Decl.], ¶59. To accomplish this, the claimed inventions recite providing a database of “calibration data” and collecting “network measurement data” observed by the mobile device. *Id.*, cl. 1. The observed network measurement data (*i.e.*, the data measurements made at the mobile device) is then modified to account for varying conditions and other variables that may be caused by, for example, environmental factors or signals propagating indoors. *Id.*, 3:43-49; EX2018 [Sturza Decl.], ¶59. Once modified, the observed network measurement data is compared with the database of calibration data to determine the location of the mobile device. EX1001 ['104 Patent], 3:43-49; EX2018 [Sturza Decl.], ¶59.

The invention of the '104 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.” EX1001 ['104 Patent], 1:33-40, 9:35-39; EX2018 [Sturza Decl.], ¶¶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.” *Id.*, 1:24-32. However, geolocation within a building—using observed data collected indoors—is often desirable. *Id.*, 1:24-32; EX2018 [Sturza Decl.], ¶¶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. EX1001, 1:24-32; EX2018 [Sturza Decl.], ¶¶60. To solve this problem, the '104 Patent independent claims are directed to modifying the observed data measured by a mobile device to eliminate disparities with previously-gathered (outdoor) calibration data. *See id.*, cl. 1. The specification describes at length what these modifications may entail and how they are performed. *Id.*, 5:5-45, 5:58-6:52, 6:53-7:19; EX2018 [Sturza Decl.], ¶¶60.

The '104 Patent is part of a family of patents currently being challenged in several IPRs. The family relationship between these patents is shown below. As seen below, each patent in the family claims priority to, and incorporates by reference, the '379 Provisional:



1. Non-Uniform Grid Points

Dependent claim 2 of the '104 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 '104 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. EX2018 [Sturza Decl.], ¶¶62. The grid points serve as additional known locations associated with signal

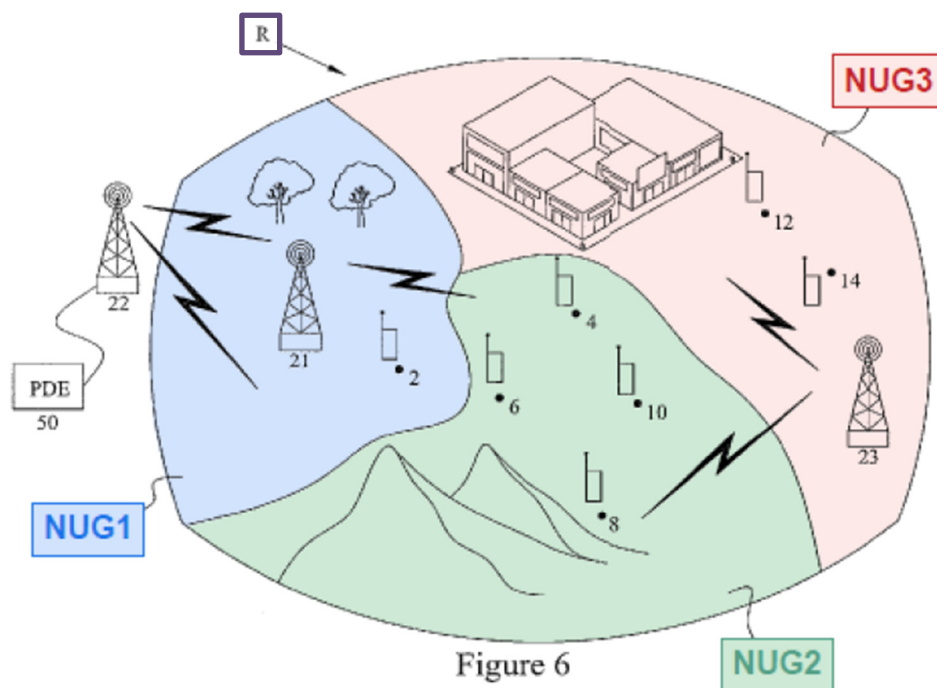
information, creating a denser “map” for mobile devices to compare observed data for the purpose of determining their location.

The grid points of the ’104 Patent “usually will not be uniformly distributed throughout the geographic region.” EX2016 [’753 patent], 2:43-50; *see also* EX1001, 3:50-60; EX2018 [Sturza Decl.], ¶63.¹ Thus, the ’104 Patent (and related patents) uses the term “non-uniform grid points” or “NUGs” when describing grid points because the grid points are clusters of similar calibration data that do not have uniform geographic shapes. *Id.* That is, the claimed grid points “represent an

¹ U.S. Patent No. 8,406,753 (EX2016, “’753 Patent”) and U.S. Patent No. 9,097,784 (EX2017, “’784 Patent”) claim priority to the same provisional application (U.S. Provisional Application No. 60/899,379 (EX2029, “’379 Provisional”) as the ’104 Patent, and describe “grid points” as the term is used in this patent family. The ’379 Provisional is incorporated by reference in the ’104 Patent (EX1001 at 1:6-9) and includes disclosures regarding “grid points” that are also found in the ’753 and ’784 Patents. *See* EX2029 [’379 Provisional], 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* EX2012 [Markman Order] at 19-20 (citing ’753 Patent (as “Ex. E”) and ’784 Patent (as “Ex. F”)).

area of collected calibration data” and “represent the signal characteristics and/or calibration data over a given region.” EX1001, 3:50-60.

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.” EX2017 ['784 Patent], 6:21-34.



Id., Fig. 6 (annotated to show each NUG in geographical region R in a different color); EX2018 [Sturza Decl.], ¶64.

As seen in the figure, each NUG corresponds to a particular area within the entire “geographical region (R).” EX2017 ['784 Patent], Fig. 6, 6:21-34 (“A NUG

may be generated to represent the signal characteristics and calibration data over a given region.”); EX2018 [Sturza Decl.], ¶¶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. EX2017 [’784 Patent], Fig. 6, 6:21-34; EX2018 [Sturza Decl.], ¶¶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.” EX2018 [Sturza Decl.], ¶¶66. This is because the boundaries of each grid point are defined by the calibration data itself. EX2029 [’379 Provisional], 7; EX2016 [’753 patent], 12:7-14; EX2018 [Sturza Decl.], ¶¶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. EX2017 [’784 Patent], Fig. 6; EX2018 [Sturza Decl.], ¶¶66. Until that evaluation, the boundaries are undefined and the claimed grid point does not exist. EX2018 [Sturza Decl.], ¶¶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. EX2018 [Sturza Decl.], ¶¶66.

This is stated explicitly in the '379 Provisional incorporated by reference in the '104 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.***

EX2029 ['379 Provisional], 7 (emphasis added); *see also* EX1001 ['104 Patent], 1:6-9 (stating that the '379 Provisional is “incorporated by reference in its entirety” in the '104 Patent). Likewise, the '753 Patent states the following:

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.***

EX2016 ['753 Patent], 12:7-14 (emphasis added); EX2018 [Sturza Decl.], ¶66.

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. EX2018 [Sturza Decl.], ¶67. 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.

EX2016 [’753 patent], Abstract, 9:34-39 (emphasis added); EX2018 [Sturza Decl.], ¶67.

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. EX2029 [’379 Provisional], 6-7; EX2016 [’753 Patent], 10:44-59; EX2018 [Sturza Decl.], ¶68. 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. EX2029 [’379 Provisional], 6-7; EX2016 [’753 Patent], 10:66-11:6; EX2018 [Sturza Decl.], ¶68. 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. EX2029 [’379 Provisional], 6;

EX2016 ['753 Patent], 10:66-11:6, 12:4-14; EX2018 [Sturza Decl.], ¶68.

The way 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. EX2018 [Sturza Decl.], ¶69. 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. EX2029 ['379 Provisional], 6; EX2016 ['753 Patent], 10:46-47; EX2018 [Sturza Decl.], ¶69. 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. EX2029 [379 provisional], 6; EX2016 ['753 patent], 10:55-59; EX2018 [Sturza Decl.], ¶69. If, however, these clusters of data are determined to be “sufficiently different,” then they are allocated to different grid points. EX2029 ['379 Provisional], 6; EX2016 ['753 Patent], 10:50-55. 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 to allocate it to different grid points defines the boundaries of that area. EX2029 ['379 Provisional], 7; EX2016 ['753 Patent], 12:9-14; EX2018 [Sturza Decl.], ¶69.

C. Challenged Claims

The Petition has challenged claims 1-4 and 6-11 of the '104 Patent. PO has filed a statutory disclaimer of claims 1, 3, and 11. EX2021. Accordingly, Patent Owner's Response focuses exclusively on claims 2, 4 and 6-10 of the '104 Patent.

D. Summary of Asserted References

1. Bhattacharya

Bhattacharya is in the field of “telecommunications in general.” EX1005 [Bhattacharya], [0001]. Bhattacharya adds a “location system 212” to an existing cellular network to use signal strength measurements performed as part of preexisting cellular protocols to attempt to estimate the location of the wireless terminal. EX1005 [Bhattacharya], [00051]; EX2018 [Sturza Decl.], ¶70; EX2020 [Sundaresan Dep. Tr.], 69:5-9 (“Q ... So what Figure 2 [of Bhattacharya] is adding that differentiates it over the prior art according to Bhattacharya is location system 212, correct? A Correct.”). Bhattacharya describes a “process and machine for estimating the location of a wireless terminal” by “comparing the signal strength [the wireless terminal] currently observes against a map or database that correlates locations to signal strengths.” *Id.*, Abstract. This estimation is performed by location system 212. EX1005 [Bhattacharya], [0059], [0064], [0065], Figs. 2-18; EX2020 [Sundaresan Dep. Tr.], 69:10-12 (“Q Location system 212 estimates the location of the wireless terminal 201, correct? A Correct.”).

In the estimation process performed by Bhattacharya's location system 212, an "Expected Signal-Strength Database" is first populated by overlaying "a rectangular grid of X by Y tessellated squares [] onto geographic region" with the "center of each square represent[ing] a location." *Id.*, [0105]-[0106]. Expected signal strength functions are "generated based on a combination of: (i) a plurality of theoretical radio-frequency propagation models, and (ii) a plurality of empirical signal-strength measurements" for locations in the geographic region. *Id.*, [0115]-[0117]. To estimate the location of a wireless terminal, Bhattacharya describes a process of comparing signal-strength measurements against the database of expected signal strengths through a series of "computationally intense" subtasks (i.e., Bhattacharya's subtasks 1702-1705) relating to generating a "current probability distribution" and "cumulative probability distribution." *Id.*, [0172]-[0173], [0179], [0189], [0195]. In the final step, the location of the wireless terminal is estimated "based on the normalized cumulative probability distribution." *Id.*, [0207].

2. Spain

Spain is in the field of "telecommunications in general." EX1007, [0001]. Spain describes a "technique for estimating the location of a wireless terminal at an unknown location in a geographic region" that is "based on the recognition that

there are traits of electromagnetic signals that are dependent on topography, the receiver, the location of the transmitter, and other factors.” EX1007, Abstract.

Spain describes a process of creating a “Trait-Correction Database” comprising information needed by the location server “to be aware of systemic measurement errors and to correct them,” such as the make and model of the wireless terminal.

Id., [0148]. Spain explains that “[f]or example, one make and model of wireless terminal is known to erroneously measure and report the signal strength of signals by -2 dB” and therefore, if the location server “adds 2 dB to the measurements

from that make and model of wireless terminal, the likelihood that location server [] would erroneously estimate the location of the wireless terminal would be

reduced.” *Id.*, [0147]. Spain then describes generating probability distributions for

the location of a given wireless terminal based on “comparing the measurements of traits associated with [a] wireless terminal.” *Id.*, [0181], [0208]-[0214]. As shown

below, Spain also describes partitioning a “geographic region 220” into different

locations based on a number of factors such as “natural and man-made physical attributes” of the region, “legal laws governing” the region, and “patterns of the

location and movement of people and vehicles” within the region:

[0086] In accordance with the illustrative embodiment, the boundaries of each location are based, at least in part, on:

[0087] i. natural and man-made physical attributes of geographic region 220 (e.g., buildings, sidewalks, roads, tunnels, bridges, hills, walls, water, cliffs, rivers, etc.),

[0088] ii. legal laws governing geographic region 220 (e.g., laws that pertain to the location and movement of people and vehicles, etc.),

[0089] iii. theoretical predictions and empirical data regarding the location and movement of individuals and groups of people and vehicles in geographic region 220,

[0090] iv. the desired accuracy of the estimates made by location server 214, and

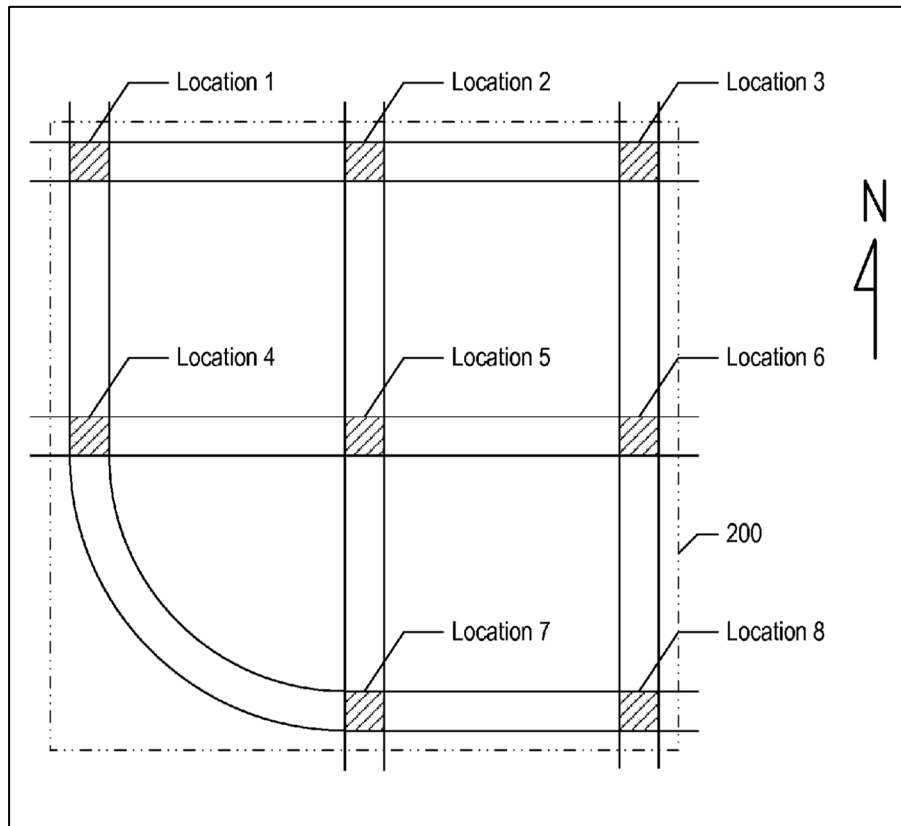
[0091] v. patterns of the location and movement of people and vehicles within geographic region 220,

[0092] vi. the calendrical time T, and

[0093] vii. the environmental conditions N,

Id., [0072], [0086]-[0093]; *see also id.*, [0094]-[0099].

Thus, the partitioning in Spain is not based on calibration data such as measured strengths of network signals. EX2018 [Sturza Decl.], ¶¶72-73. Rather, as is apparent from this disclosure, the partitioning is based on environmental conditions that are independent of any calibration data. *Id.* This is consistent with the partitioning merely being an overlay on a geographic region independent of any calibration data, as shown in Spain's figures:



Id., Fig. 6c; *see also id.*, Figs. 6a, 6b, 6d-6k.

Spain also emphasizes that the partitioning is a function of the desired accuracy and “computational burden,” further demonstrating that the partitioning is also based on factors determined by the operator of the system, but not based on measured calibration data. *Id.*, [0094]-[0097]; EX2018 [Sturza Decl.], ¶¶74.

3. Zeng

Zeng is an excerpted chapter from the Handbook of Wireless Networks and Mobile Computing. EX1006, 1. Zeng explains the concept of handoffs in wireless mobile networks. EX1006, 1. Zeng explains that a “handoff” in this context is “the

process of changing the channel (frequency, time slot, spreading code, or combination of them) associated with the current connection while a call is in progress.” *Id.* Zeng further describes various “handoff schemes” that can be used in cellular technologies. *Id.*, 4-5. Zeng is an overview document that is not tied to any specific cellular standard and does not discuss navigation or geolocation.

E. Level of Ordinary Skill

The Petition does not identify a level of ordinary skill. In Petitioner’s expert report, Dr. Sundaresan states “*I have been informed* that a person of ordinary skill in the art (‘POSITA’) had at least a Bachelor’s degree in electrical engineering, computer science, or a similar discipline, and at least two years of experience in the field working with navigation and/or geolocation systems.”:

IV. LEVEL OF ORDINARY SKILL IN THE ART

8. I have been informed that a person of ordinary skill in the art (“POSITA”) had at least a Bachelor’s degree in electrical engineering, computer science, or a similar discipline, and at least two years of experience in the field working with navigation and/or geolocation systems. Superior education could compensate for a deficiency in work experience, and *vice-versa*. Based on my experiences, I have a good understanding of the capabilities of a POSITA. I have taught, mentored, advised, and collaborated closely with many such individuals over the course of my career.

EX1003 [Sundaresan Decl.], ¶8.

The level of ordinary skill Petitioner’s attorneys provided to Dr. Sundaresan is incorrect. EX2018 [Sturza Decl.], ¶¶45-49. The ’104 Patent and the asserted references in this IPR are all from the field of wireless telecommunications—specifically, cellular technology. Accordingly, a POSITA definition that accounts for experience in wireless telecommunications and cellular technology is necessary. EX2018 [Sturza Decl.], ¶46. The definition proposed by Petitioner in the related IPR2024-01209 involving the ’104 Patent is more appropriate:

A POSITA would have been (1) someone knowledgeable in wireless networks, cellular radio systems, mobile communication devices and radio navigation systems, (2) 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.

See Google LLC v. Geoscope Technologies Pte. Ltd., IPR2024-01209, Paper 2 (Petition), at 13-14. However, consistent with the definition provided by Petitioner's attorneys, bachelor degrees in computer science or a similar discipline would be acceptable as an alternative to electrical engineering, and superior education could compensate for a deficiency in work experience, and *vice-versa*. EX2018 [Sturza Decl.], ¶46.

III. CLAIM CONSTRUCTION

The Petition adopted the district court's constructions for the terms "calibration data," "observed network measurement data" and "grid point." Pet., 3 ("The applied prior art references disclose and/or render obvious all of the elements of the challenged claims under any of the above-noted constructions"); EX2020 [Sundaresan Dep. Tr.], 36:1-10 ("Q And you're applying these constructions or stipulations in your analysis in your declarations? A Correct. Q And just to be clear that's – that's for all four declarations you've submitted? A Right. Q Do you agree with the district court's constructions? A Yes. I do.").

The Institution Decision construed the term “grid point” but declined to construe any other term “because doing so would have no effect on our analyses below.”

D.I., 9.

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.*, 1314. The ’104 Patent specification specifically incorporates the ’379 Provisional by reference. EX1001 [’104 Patent], 1:6-9; *see 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)).

For purposes of this Patent Owner Response, PO adopts the district court’s construction of “calibration data” as “modified or unmodified network measurement data associated with a geographic location” and proposes more specifically construing “grid point,” or alternately, “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.” PO does not believe any other terms need construed at this point in the proceedings.

A. “Calibration Data”

PO proposes the following construction for “calibration data”:

Term	Proposed Construction
“calibration data”	“modified or unmodified network measurement data associated with a geographic location”

This is the same construction adopted by the district court and adopted in the Petition. Pet., 2; EX2012 [Markman Order], 6-8. The ’104 Patent improves the location accuracy of a mobile device by collecting “calibration data” at defined, known locations, which are then stored in a database for further use. See EX1001 [’104 Patent], 1:21–3:11, 11:65–12:15. “Calibration data” includes network measurement data such as “signal strength, round trip time, time difference of arrival (TDOA), etc.” *Id.*, 1:21-24. The ’104 Patent similarly describes the calibration database as “a collection of data from . . . grids that contain network measurements with associated location estimates.” EX1001 [’104 Patent], 10:55–58. *See, e.g., id.*, 1:47-50. Thus, “calibration data” is “network measurement data associated with a geographic location.” EX2018 [Sturza Decl.], ¶¶80-81.

B. “[Non-Uniform] Grid Point”

PO proposes the following constructions for “grid point” or, alternately, “non-uniform grid point”:

Term	Proposed Construction
“Grid Point” or (alternately) “Non-Uniform Grid Point” (claim 2)	“a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data.”

PO’s construction here is different than the construction PO proposed in the district court because it accounts for the district court’s construction.

In the Institution Decision, 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., 9; EX2012 [Markman Order]. 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.*, 28.

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.*, 26-27. As explained further below, however, the district court’s use of the phrase “representative calibration data for an area” requires that the claimed grid points be generated

based on the measured calibration data. *Infra* § III.B; EX2018 [Sturza Decl.], ¶84. That is, the grid point is associated with calibration data that is representative of a particular area.

Alternately, PO requests the Board construe the claim term “*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 record 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 evaluating calibration data that has been previously gathered in that region and grouping similar clusters of calibration together. *Infra* § III.B.2; EX2018 [Sturza Decl.], ¶85.

1. 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.” Ex2012 [Markman Order], 18-20. In its *Markman* Order, the district court expanded on what this construction means in the context of the ’104 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.” In doing so, the district court explained

that “Defendants’ [Petitioner’s] use of ‘representative calibration data’ is intended 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.” EX2012 [Markman Order], 20 (emphasis added) (citing EX1001 [’104 Patent], 3:56-60; EX2016 [’753 Patent], 10:29-11:7; EX2017 [’784 Patent], 6:22-28). Thus, the district court explained that it selected Petitioner’s construction because the “defining characteristic” of a NUG is 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 NUG. EX2018 [Sturza Decl.], ¶¶87.

Further, the district court construction requires that a “grid point” must be associated with calibration data that is *representative for an area*. EX2018 [Sturza Decl.], ¶¶88. 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. EX2018 [Sturza Decl.], ¶¶88-89. The ’379 Provisional—which is incorporated by reference in the ’104 Patent (EX1001, 1:6-9)—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. EX2029 ['379 Provisional], 6 (“If the aggregated cluster is statistically very similar to either of the first clusters, the data for the two calibration points are allocated to the same NUG”), 7 (“The NUGs fully cover the region R and each NUG has statistically similar data accumulated into itself”); EX2016 ['753 Patent], 10:39-65, 12:4-14; EX2018 [Sturza Decl.], ¶89. Similarly, the '379 Provisional and '753 Patent teach examples of the statistical analyses used to generate the claimed grid points from this calibration data. EX2029 ['379 Provisional], 6; EX2016 ['753 Patent], 10:66-11:6; EX2018 [Sturza Decl.], ¶89. Further, what may constitute representative calibration data for an area is a subset of the calibration data that is collected through a broader region. EX2018 [Sturza Decl.], ¶89; EX2017 ['784 Patent], 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)); EX1001, 3:50-60 (describing same).

Thus, the district court’s construction 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. EX2018 [Sturza Decl.], ¶90. 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. EX2018 [Sturza Decl.], ¶90. 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.” EX2012 [Markman Order], 19 (quoting ’753 Patent, 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. EX2018 [Sturza Decl.], ¶91.

The Institution Decision cites the district court’s statement that the “[cited] language is directed more toward what must be done to arrive at a grid point or set of grid points rather than what a grid point is.” D.I., 31. But the district court comment was limited to disclosure in the Abstract. EX2012 [Markman Order], 19. Further, PO’s construction in this IPR is different than the construction it advanced

in the district court and is a corollary to the construction provided by the district court. *Unitherm Food Sys., Inc. v. Swift-Eckrich, Inc.*, 375 F.3d 1341, 1351 (Fed. Cir. 2004) (proper definition is the “definition that one of ordinary skill in the art could ascertain from the intrinsic evidence in the record”).

Further, 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. EX2018 [Sturza Decl.], ¶92. 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. EX2029 [’379 Provisional], 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); EX2018 [Sturza Decl.], ¶92. The intrinsic evidence confirms that how the claimed grid points are generated is an essential characteristic of what they are. *See infra* § III.B.2. 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.” EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl.], ¶93. 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. EX2016 [’753 Patent], 10:39-11:6, 12:4-14; EX2018 [Sturza Decl.], ¶¶93.

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 ’104 Patent have this same requirement.² As explained further below, this requirement is also supported by the intrinsic evidence. *Infra* § III.B.2.

2. 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* § III.B.1. And this requirement is similarly applicable to “non-uniform grid points.” *Id.*

² The Institution Decision 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 28.

To the extent the Board disagrees with PO’s construction of “grid point,” the term “non-uniform grid point” should be 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 shapes, sizes and boundaries of the non-uniform grid points are different. EX1001 [’104 Patent], cl. 2; EX2018 [Sturza Decl.], ¶¶97. Further, claim 2 requires that the “[calibration] database” comprises “previously-gathered calibration data for one or more non-uniform grid points within said region.” *Id.* Thus, the claim requires assigning the calibration data gathered over a predetermined region to “one or more non-uniform” grid points. *Id.*, cls. 1, 2; EX2018 [Sturza Decl.], ¶¶97.

The specification also requires Patent Owner’s proposed construction of “non-uniform grid point.” EX2018 [Sturza Decl.], ¶¶98. The ’104 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.” EX1001 [’104 Patent], 3:50-56; EX2018 [Sturza Decl.], ¶¶98. 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. EX2018 [Sturza Decl.], ¶98. 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.*

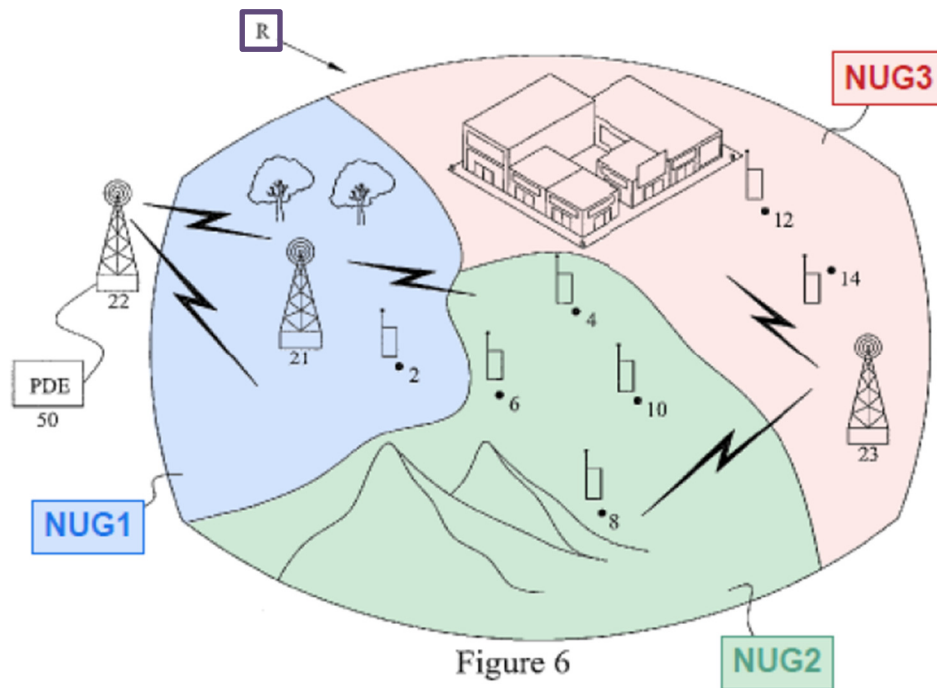
EX2029 ['379 Provisional], 7 (emphasis added); *see also* EX1001 ['104 Patent], 1:6-9 (stating that the '379 Provisional is “incorporated by reference in its entirety” in the '104 Patent); EX2018 [Sturza Decl.], ¶99.

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.*

EX2016 ['753 Patent], 12:7-14 (emphasis added); EX2018 [Sturza Decl.], ¶100.

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.”



EX2017 ['784 Patent], Fig. 6 (annotated to show each NUG in geographical region R in a different color), 6:21-34; EX2018 [Sturza Decl.], ¶101.

As shown in the annotated figure, each NUG corresponds to an area that is part of a broader region (R). EX2017 ['784 Patent], Fig. 6; EX2018 [Sturza Decl.], ¶102; *see also supra* § II.B.1 (further describing the claimed grid points of the '104 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. EX2016 ['753 Patent], 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.”); EX2018 [Sturza Decl.], ¶102.

Because non-uniform grid points “represent an area of collected calibration data” (EX1001, 3:56-60)—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. EX2029 [379 Provisional], 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.”); EX2018 [Sturza Decl.], ¶103; *see also supra* § II.B.1. 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 states 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. EX2029 [379 Provisional], 6; *see also* EX1001, 1:6-9; EX2018 [Sturza Decl.], ¶104. The ’379 Provisional further explains that the data is evaluated “using increasingly stringent

tests of statistical sufficiency.” EX2029 [’379 Provisional], 6; *see also* EX1001, 1:6-9; EX2018 [Sturza Decl.], ¶104. 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. EX2029 [379 Provisional], 6-7; *see also* EX2018 [Sturza Decl.], ¶104. Multiple methods of evaluating statistical similarities across the calibration data may be used to allocate calibration data to different grid points. EX2029 [’379 Provisional], 6 (referring to “clustering tests” and “K-means algorithm”). For example, calibration data is evaluated to determine whether it “exhibit[s] clustering.” EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl.], ¶104. 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. EX2029 [’379 Provisional], 6; *see also* EX2018 [Sturza Decl.], ¶104.

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. EX2029 [’379 Provisional], 7; *see also* EX2018 [Sturza Decl.], ¶105. 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. EX2018 [Sturza Decl.], ¶105. 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. EX2029 [’379 Provisional], 7; *see also* EX2018 [Sturza Decl.], ¶105. The related ’753 Patent reiterates this as well. EX2016 [’753 Patent], 10:66-11:6, 12:7-14; EX2018 [Sturza Decl.], ¶105.

For these reasons, one of skill in the art (*see supra* § II.E) would understand, in view of the intrinsic evidence, that the term “non-uniform grid point” as used in the ’104 Patent means “a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data.” EX2018 [Sturza Decl.], ¶106. 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* § III.B.1.

Nonetheless, if the Board concludes otherwise, it should adopt this proposed construction for “non-uniform grid point.”

IV. PETITIONER FAILS TO MEET ITS BURDEN TO PROVE THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. The Petition Cannot Meet Its Burden Because It Has Not Identified A Level of Skill In The Art

The Petition must identify, “in writing and with particularity, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim.” 35 U.S.C. §312(a)(3). *See also* 37 C.F.R. §42.104(b)(4) (“The [Petition] must identify ... [h]ow the construed claim is unpatentable under the statutory grounds identified in paragraph (b)(2) of this section.”).

Both grounds in the Petition are obviousness grounds under 35 U.S.C. §103. Pet., 1. Ground 1A combines Bhattacharya and Zeng and Ground 1B combines Bhattacharya, Zeng, and Spain. *Id.* Under the objective analysis laid out in *Graham v. John Deere* for determining obviousness under §103, “the scope and content of the prior art are ... determined; differences between the prior art and the claims at issue are ... ascertained; and the level of ordinary skill in the pertinent art resolved.” *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18. *See also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 399 (2007) (same). “Against this background, the obviousness or nonobviousness of the subject matter is determined.” *Id.*

Indeed, resolving the level of ordinary skill provides the objective baseline that is necessary to understand the claims. “The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline

from which to begin claim interpretation.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). For Petitioner to meet its burden, the Petition must resolve the level of ordinary skill in the pertinent art. *See, e.g.*, 37 C.F.R. §42.104(b)(4) (“How the construed claim is unpatentable under the statutory grounds identified in paragraph (b)(2) of this section.”)

The Petition does not address the level of ordinary skill. Instead, it references Dr. Sundaresan’s expert declaration. *See* Pet., 7 (referencing EX1003 [Sundaresan Decl.], ¶8). But incorporating expert testimony by reference does not meet the statutory requirement for the *petition* to “identif[y] in writing and with particularity ... the grounds on which the challenge to each claim is based.” 35 U.S.C. §312(a)(3). *See also* 37 C.F.R. §42.104(b)(4). As explained above, an analysis of the level of ordinary skill in the pertinent art is required for determining obviousness, as well as interpreting and construing claims. *Graham* at 1, 17-18; *KSR* at 399; *Phillips*, 415 F.3d at 1313. Without such an analysis, the Petition cannot carry its burden.

The PTAB’s rules prohibit arguments from being incorporated by reference from one document to another as Petitioner has done here. 37 C.F.R. §42.6(a)(3) (“***Incorporation by reference; combined documents.*** Arguments must not be incorporated by reference from one document into another document. Combined

motions, oppositions, replies, or other combined documents are not permitted.”); PTAB Trial Practice Guide, 35-36 (“parties that incorporate expert testimony by reference in their petitions, motions, or replies without providing explanation of such testimony risk having the testimony not considered by the Board.”). The Federal Circuit has repeatedly affirmed this rule. *See, e.g., Gen. Access Sols., Ltd. v. Sprint Spectrum L.P.*, 811 F. App’x 654, 658 (Fed. Cir. 2020) (affirming PTAB’s exclusion of detailed conception arguments from declaration incorporated by reference into POR where the POR only cursorily discussed conception); *Bos. Sci. Neuromodulation Corp. v. Nevro Corp.*, 813 F. App’x 572, 582-583 (Fed. Cir. 2020) (affirming Board’s exclusion of objective indicia arguments from expert report that were incorporated by reference into POR); *3M Co. v. Evergreen Adhesives, Inc.*, 860 F. App’x 724, 725-728 (Fed. Cir. 2021) (affirming Board’s exclusion of arguments regarding POSITA’s knowledge that were only present in expert declaration).

Moreover, even if the controlling statutes, rules, and court decisions requiring the level of ordinary skill to be addressed in the Petition did not exist, Dr. Sundaresan’s declaration does not remedy the issue because it simply adopts attorney argument without any evidentiary basis. Dr. Sundaresan states “***I have been informed*** that a person of ordinary skill in the art (‘POSITA’) had at least a

Bachelor's degree in electrical engineering, computer science, or a similar discipline, and at least two years of experience in the field working with navigation and/or geolocation systems.”:

IV. LEVEL OF ORDINARY SKILL IN THE ART

8. I have been informed that a person of ordinary skill in the art (“POSITA”) had at least a Bachelor's degree in electrical engineering, computer science, or a similar discipline, and at least two years of experience in the field working with working with navigation and/or geolocation systems. Superior education could compensate for a deficiency in work experience, and *vice-versa*. Based on my experiences, I have a good understanding of the capabilities of a POSITA. I have taught, mentored, advised, and collaborated closely with many such individuals over the course of my career.

EX1003 [Sundaresan Decl.], ¶8.

Nowhere does Dr. Sundaresan indicate that he agrees with the definition he was provided, much less provide any analysis supporting the definition he was provided. Thus, Dr. Sundaresan is not providing *his* opinion on level of ordinary skill, he is uncritically adopting a definition provided by Petitioner's attorneys without providing any analysis or evidence in support. Because Dr. Sundaresan's statement simply adopts the position of Petitioner's attorneys without any

underlying analysis or evidence, it does not constitute “evidence or opinions” (35 U.S.C. § 312(a)(3)(B)) and is entitled to no weight. *See, e.g.,* Fed. R. Evid. 702(b) (expert testimony “must be based on sufficient facts or data”); *TQ Delta, LLC v. Cisco Sys.*, 942 F.3d 1352, 1359 (Fed. Cir. 2019) (“This court’s opinions have repeatedly recognized that conclusory expert testimony is inadequate to support an obviousness determination on substantial evidence review”); *Xerox Corp. et al. v. Bytemark, Inc.*, IPR2022-00624, Paper 12 at 5 (PTAB Director Review Decision, Feb. 10, 2023) (“I agree with the Board’s explanation that ‘the cited declaration testimony is conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight’ under 37 C.F.R. §42.65(a).”).

Nor do the Petition or Dr. Sundaresan’s declaration identify the alleged field of pertinent art as required by *Graham* and *KSR*. EX1003 [Sundaresan Decl.], ¶ 8. For this additional reason, the Petition fails.

The Petition cannot show that the claims are unpatentable by a preponderance of the evidence because it does not resolve the level of ordinary skill in the art, or even what the alleged field of pertinent art is. These defects require the Board to find all challenged claims not unpatentable.

B. Petitioner’s Rationales For Combining Fail

1. A POSITA as defined by Petitioner's attorneys lacks the background to combine Bhattacharya with Zeng

Even if it were sufficient to rely solely on attorney argument in an expert declaration for the level of ordinary skill (it is not), a POSITA as defined by Petitioner's attorneys would not combine the asserted references.

Petitioner's attorneys define a POSITA as a person with "at least a Bachelor's degree in electrical engineering, computer science, or a similar discipline, and at least two years of experience in the field working with working with navigation and/or geolocation systems." EX1003 [Sundaresan Decl.], ¶8.

The asserted references are directed to telecommunications and cellular technology. EX2029 ['379 Provisional], [0001] ("The present invention relates to telecommunications in general"); EX1006 [Zeng], Title ("Handoff in Wireless Mobile Networks"); EX1007 [Spain], [0001] ("The present invention relates to telecommunications in general"). Bhattacharya and Spain disclose cellular systems that can be used for geolocation applications. EX1005 [Bhattacharya], Title ("Estimating the location of a wireless terminal based on calibrated signal-strength measurements"); EX1007 [Spain], Title ("Estimating the location of a wireless terminal based on non-uniform locations"). Zeng is strictly a cellular reference that does not involve geolocation or navigation. EX1006 [Zeng], Title ("Handoff in Wireless Mobile Networks"). As such, someone seeking to combine these

references would need significant experience working with cellular technologies.

EX2018 [Sturza Decl], ¶112.

A POSITA as defined by Petitioner’s attorneys has no experience in cellular technologies or telecommunications. EX1003 [Sundaresan Decl.], ¶8; EX2018 [Sturza Decl.], ¶113. Such a person has no background with cellular technologies and would not be familiar with concepts such as handoff in wireless mobile networks. EX2018 [Sturza Decl.], ¶113. These are not trivial concepts; wireless technologies are debated and revised by experts in the field with decades of experience for years before being adopted. EX2018 [Sturza Decl.], ¶113.

Petitioner argues that “[w]hile lacking specific handoff operations performed by the wireless switching center 211, Bhattacharya acknowledges that such operations are performed in a ‘well known fashion.’” Pet., 24. But Bhattacharya is referring to handoff operations that would be “well known as part of the GSM protocol and the mobile-assisted hand-off process.” EX1005 [Bhattacharya], [0095]. The “GSM protocol” is a cellular standard, and the “mobile-assisted hand-off process” is part of cellular technologies. EX2018 [Sturza Decl.], ¶114. Thus, Bhattacharya is referring to technology that would be “well-known” to a POSITA with a background in cellular technologies, not navigation and geolocation technologies. EX2018 [Sturza Decl.], ¶114. A POSITA as defined by Petitioner’s

attorneys would not be familiar with the mobile-assisted hand-off process of the GSM protocol and thus would not understand how to perform specific handoff operations. EX2018 [Sturza Decl.], ¶114.

Similarly, Petitioner argues that “Bhattacharya itself provides the motivation to a POSITA to seek well-known handoff functionality beyond its disclosure given recognition that such functionality enables location estimation ‘when a wireless terminal is near the boundary of one or more systems.’” Pet., 24 [quoting EX1005, [0054]]. But Bhattacharya paragraph [0054] is not talking about handoff functionality between two base stations; it is discussing obtaining signal strength measurements from two adjacent systems. EX2018 [Sturza Decl.], ¶115; EX1005 [Bhattacharya], [0054] (“The illustrative embodiment comprises one wireless switching system, but after reading this disclosure it will be clear to those skilled in the art how to make and use alternative embodiments of the present invention that use two or more systems.”). Bhattacharya goes on to provide an example using signals from the IS-41 cellular telecommunications systems standard. *Id.* See EX2018 [Sturza Decl.], ¶115. A POSITA as defined by Petitioner’s attorneys is not “skilled in the art” of cellular telecommunications systems and would not be expected to be familiar with IS-41. EX2018 [Sturza Decl.], ¶115.

Petitioner argues that “A POSITA would have perceived this teaching to be relevant to Bhattacharya’s wireless switching center 211, which is ‘capable of relaying [] packet data’ and implements the mobile-assisted hand-off process.” Pet., 25 (quoting EX1005 [Bhattacharya], [0095]). Again, a POSITA with expertise in “navigation and/or geolocation systems” (EX1003 [Sundaresan Decl.], ¶8) has no experience in cellular technologies and therefore would not be familiar with “wireless switching” or “mobile-assisted hand-off process[es]”. EX2018 [Sturza Decl.], ¶116.

Petitioner states that “a POSITA would have incorporated handoff functionality into the improved wireless switching center in a manner that preserves other functionality described in Bhattacharya, such as ‘forward[ing] the [Signal-Strength Measurement Reports (SSMR)] to location system 212.’” Pet., 26 (quoting EX1005 [Bhattacharya], [0095]). Again, a POSITA under Petitioner’s attorneys’ definition would not necessarily have the background to understand handoff functionality in wireless switching, let alone understanding concepts such as preserving SSMR forwarding. EX2018 [Sturza Decl.], ¶117.

The Petition goes on to state “Since Bhattacharya teaches transmitting signal-strength measurements in the form of SSMRs, a POSITA would have leveraged the use of SSMRs in configuring handoff functionality and location

estimation functionality in the improved wireless switching center.” Pet., 26.

SSMRs and handoff functionality are cellular technology concepts that have nothing to do with “navigation and/or geolocation systems.” EX2018 [Sturza Decl.], ¶118; EX1003 [Sundaresan Decl.], ¶8. Thus, a POSITA as defined by Petitioner’s attorneys has no basis for “leveraging the use of SSMRs in configuring handoff functionality.”

2. Petitioner’s proposed combination misinterprets Bhattacharya and Zeng

Petitioner seeks to combine the handoff functionality described in Zeng into Bhattacharya to “enable[] an improved wireless switching center ... to thereby improve service ‘when a wireless terminal is near the boundary of one or more systems’ (as described in Bhattacharya).” Pet., 25 (citing EX1005 [Bhattacharya], [0054]). Bhattacharya [0054] is not concerned with improving service or handing off within a cellular system. EX2018 [Sturza Decl.], ¶119. Instead, it is concerned with using signal-strength measurements from two or more nearby wireless telecommunications systems to help estimate the location of the wireless terminal. EX2018 [Sturza Decl.], ¶119.

That is, the wireless switching center in Bhattacharya [0054] sends “HandoffMeasurementRequest and HandoffMeasurementRequest2” messages to a second wireless switching center in an adjacent system to request a response from

the second wireless switching center. EX2018 [Sturza Decl.], ¶120. But the wireless switching center in Bhattacharya is not requesting a handoff; instead, it is requesting a measurement signal from the second system. EX2018 [Sturza Decl.], ¶120; EX2020 [Sundaresan Dep. Tr.], 73:11-15. (“Q But the wireless switching center in [Bhattacharya [0054]] isn’t concerned about the hand-over for purposes of the Bhattacharya. It’s concerned with getting the signal strength measurements, correct? A Correct.”). The mobile station then measures the response from the second system to obtain a signal strength measurement from the second system. EX2018 [Sturza Decl.], ¶120.

While, in a cellular system, the HandoffMeasurementRequest and HandoffMeasurementRequest2 messages could potentially be used in part to determine whether to initiate a handoff to another system, that is not what Bhattacharya is teaching. Instead, Bhattacharya is using these messages as a proxy for location determination. EX2018 [Sturza Decl.], ¶121; EX2020 [Sundaresan Dep. Tr.], 73:8-10 (“You don’t have to execute a hand-over but these messages facilitate a hand-over process.”). Bhattacharya is not concerned with handoffs between two systems in wireless mobile networks, it is concerned with obtaining another signal for location determination. EX1005 [Bhattacharya], [0054] (“When two or more systems are used to obtain signal-strength measurements, one wireless

switching center can use the IS-41 protocol messages [] *to elicit signal-strength measurements from another.*”) (emphasis added); EX2018 [Sturza Decl.], ¶121. A POSITA would have no reason to look to Zeng to solve a cellular network handover problem that Bhattacharya does not mention.

Moreover, the Zeng reference does not discuss adjacent cellular systems. EX1006 [Zeng]. Instead, it discusses handoff between base stations in the same network or system. Zeng Fig. 1.1 below illustrates this:

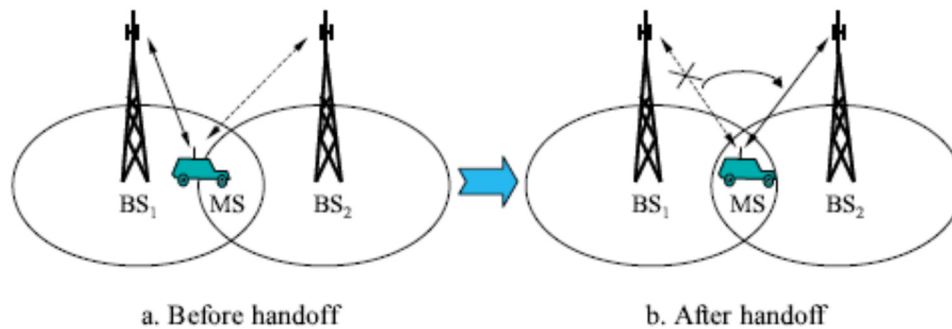


Figure 1.1 Hard handoff between the MS and BSs.

Thus, a POSITA would not look to Zeng to improve the functionality described at Bhattacharya [0054] because Zeng is directed to basic handoff functionality between two base stations in the same system. To the contrary, Bhattacharya [0054] is directed to measuring signal strengths from two different systems. EX2018 [Sturza Decl.], ¶¶122-123.

Petitioner provides two examples of its hypothetical “Bhattacharya-Zeng” combination. Pet., 27, 28. These examples use Zeng to perform handoff in a

cellular system and have nothing to do with determining location. *Id.*, EX2018 [Sturza Decl.], ¶124. While Petitioner’s examples forward the received SSMR to location system 212 in what Petitioner notes as step (4), there is no explanation of how Zeng’s handoff determination is involved with or relevant to Bhattacharya’s location system 212, which performs Bhattacharya’s location estimation. Zeng discloses evaluating signal strength to perform a handoff; nothing in Zeng or Bhattacharya explains why this process would be relevant to Bhattacharya’s location estimation. EX2018 [Sturza Decl.], ¶¶124-125. Not only would a POSITA as defined by Petitioner’s attorneys not understand how to implement cellular handoffs, there is no explanation other than hindsight as to why Zeng’s handoff procedures would be useful for location determination. EX2018 [Sturza Decl.], ¶125. Thus, Petitioner’s combination fails.

3. Petitioner fails to show a reasonable expectation of success

Petitioner argues that “a POSITA would have reasonably expected to succeed in configuring Bhattacharya-Zeng to leverage Zeng’s handoff functionality since its implementation would have required only routine knowledge well within the skill of a POSITA...” Pet., 29. Again, a POSITA as defined by Petitioner’s attorneys has no experience with cellular technology. Even if Zeng’s handoff functionality were routine knowledge in cellular technologies, a person

with experience in navigation and geolocation does not have knowledge of cellular technologies or how handoffs function in cellular technologies. EX2018 [Sturza Decl.], ¶126.

In reality, handoff functionality in cellular networks is specified by complex standards that must be closely followed. EX2018 [Sturza Decl.], ¶127. *See, e.g.*, EX1005 [Bhattacharya], [0052] (noting that “the illustrative embodiment operates in accordance with the [GSM protocol]” but that “other protocols, such as, for example, [UMTS], CDMA-2000, IS-136 TDMA, Short Message Service [or] Circuit Switched Data” could be used). Each of these protocols specifies its own method for performing handoffs to ensure interoperability and efficiency. EX2018 [Sturza Decl.], ¶127. A person with no background in cellular technology cannot be expected to implement different handoff methods ad hoc within an existing network using one of these protocols and expect the network to function. EX2018 [Sturza Decl.], ¶127. Accordingly, Petitioner has not shown a reasonable expectation of success.

C. Dr. Sundaresan’s Declaration Is Entitled To No Weight

Expert testimony must be “based on sufficient facts and data.” Fed. R. Evid. 702(b). “Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.” 37 C.F.R. §42.65(a).

Similarly, expert testimony must be “the product of reliable principles and methods.” Fed. R. Evid. 702(c). Moreover, the “expert’s opinion [must reflect] a reliable application of the principles and methods to the facts of the case.” Fed. R. Evid. 702(d).

Dr. Sundaresan’s declaration fails to provide underlying facts and data and fails to apply reliable principles and methods to the facts of the case in a number of instances. First, as discussed above, Dr. Sundaresan does not actually provide his opinion, let alone facts and data supporting his opinion, on the level of ordinary skill. *See* § III.B.1, *supra*. Dr. Sundaresan’s blanket adoption of a definition provided by Petitioner’s attorneys is not “a reliable application of the principles and methods to the facts of [this] case” (Fed. R. Evid. 702(d)) and is precisely the sort of “conclusory and unsupported” assertion that has repeatedly been held to be entitled to little or no weight. *Xerox Corp. et al. v. Bytemark, Inc.*, IPR2022-00624, Paper 12 at 5 (PTAB Director Review Decision, Feb. 10, 2023). *See, e.g., TQ Delta, LLC v. Cisco Sys.*, 942 F.3d 1352, 1359 (Fed. Cir. 2019) (“This court’s opinions have repeatedly recognized that conclusory expert testimony is inadequate to support an obviousness determination on substantial evidence review”).

Second, Dr. Sundaresan’s opinions on claim interpretation are unsupported by any evidence or analysis. *See, e.g.*, EX1003 [Sundaresan Decl.], ¶¶26-29. Dr. Sundaresan adopts the claim constructions from the district court’s Markman Order as his own. EX1003 [Sundaresan Decl.], ¶29; EX2020 [Sundaresan Dep. Tr.], 35:8-10 (“Q Are you applying the district court’s constructions in your analysis? A Yes.”). Dr. Sundaresan agrees with the district court’s constructions. EX2020 [Sundaresan Dep. Tr.], 36:8-10 (“ Q Do you agree with the district court’s constructions? A Yes. I do.”). Yet Dr. Sundaresan provides no evidence, argument, or other support, explaining why, in his opinion, the district court’s constructions are correct. EX1003 [Sundaresan Decl.], ¶¶26-29. *See* Fed. R. Evid. 702(b)-(d); PTAB Consolidated Trial Practice Guide, 44 (“If a petitioner believes that a claim term requires an express construction, the petitioner must include a statement identifying a proposed construction of the particular term and where the intrinsic and/or extrinsic evidence supports that meaning.”); 46 (“the parties should point out the specific portions of the specification, prosecution history, and relevant extrinsic evidence they want considered, and explain the relevancy of any such evidence to the arguments they advance. Each party bears the burden of providing sufficient support for any construction advanced by that party.”).

Nor does Dr. Sundaresan rely on the claim construction analysis performed by the district court. Dr. Sundaresan testified he “ha[d]n’t analyzed [the claim construction order] deeply” and that his “focus was on what the final construction was that the district court stipulated.” EX2020 [Sundaresan Dep. Tr.], 38:12-15. Dr. Sundaresan emphasized that the court’s ultimate construction, rather than the rationale behind the construction, was his “key take away from this district court order.” *Id.*, 38:15-16. In other words, Dr. Sundaresan testified that he adopted the district court’s ultimate constructions without considering whether the underlying analysis was correct.

This was born out in Dr. Sundaresan’s cross-examination testimony. Dr. Sundaresan was unable to opine on whether he agreed with the district court’s analysis:

- EX2020 [Sundaresan Dep. Tr.], 39:25-40:6: Q So you agree with the court’s final construction [for calibration data]? A Yes. Q But you don’t have an opinion on whether the court’s analysis is correct? A Yeah. I don’t have an opinion at this point on the court’s analysis.
- 40:18-41:1: Q So you agree with the final construction [for observed network measurement data]? A Yes. I do. Q With respect to the court’s analysis, is it fair to say you’ve reviewed the analysis but you haven’t formed an opinion on whether it’s correct? A Yeah. I’ve reviewed it but I haven’t analyzed it deeply to form an opinion...

- 43:25-44:6: Q And for [the district court's analysis of grid point], it's fair to say that you've reviewed the section but you don't have an opinion about whether the court's rationale is correct? ... A Yeah. I'm not opining either way because I haven't analyzed [the court's rationale] deeply...
- 52:24-25: A [The district court's statement is] quite broad and vague and it's hard to opine one way or the other.
- 53:11-13: A [statistically very similar as used in the district court's analysis] is a quite indefinite and vague term that I don't understand what it means.
- 57:3-11: Q ... you're unable to tell me whether you agree with the statement from page 20 of the claim construction order that 'the defining characteristic of a NUG region 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'; is that correct? A With respect to that statement.

Moreover, Dr. Sundaresan interpreted the claims and formed his claim construction opinions without considering the entire intrinsic record. The '104 Patent incorporates Provisional Application No. 60/899,379 by reference. EX1001 ['104 Patent], 1:6-9; *see supra*, §II.B. Petitioner did not submit the '379

Provisional as an exhibit in this IPR³ and Dr. Sundaresan did not list it in his list of Materials Considered. EX1003 [Sundaresan Decl.], ¶20. When asked, Dr. Sundaresan testified that he had reviewed the '379 Provisional at some point, but was “not sure if I used it as part of the declaration [he did not] but I came to review it later” and that he was “not seeing it as part of my declaration, so I would assume that it wasn’t part of the analysis then.” EX2020 [Sundaresan Dep. Tr.], 59:16-18, 60:6-8. Dr. Sundaresan further testified that when he eventually did review the '379 Provisional, “I don’t think I did a deep dive, that much is clear.” *Id.*, 62:1-2.

Aside from the '379 Provisional, Dr. Sundaresan’s analysis of the intrinsic record had other serious flaws. With respect to the prosecution history, Dr. Sundaresan’s materials considered lists only “Excerpts of the Prosecution History.” EX1003 [Sundaresan Decl.], ¶20. Dr. Sundaresan testified he reviewed these excerpts “briefly as part of the analysis” for his declaration but “might have not done a deep dive.” EX2020 [Sundaresan Dep. Tr.], 60:24-61:1. Similarly, Dr. Sundaresan testified he did not consider the related '784 and '753 Patents in preparing his declaration. EX2020 [Sundaresan Dep. Tr.], 65:1-15.

³ Patent Owner submits the '379 Provisional with this POR as Exhibit 2029.

These are public materials that were known and available to Dr. Sundaresan when he prepared his declaration. The '379 Provisional is listed on the face of the '104 Patent and expressly incorporated by reference in its entirety into the intrinsic record. EX1001 ['104 Patent], (60), 1:6-9. The file history—in its entirety—always forms part of the intrinsic record and as such, is highly relevant. *Phillips* at 1317. The '753 and '784 Patents are related patents that were cited as support in the district court's claim construction order regarding some of the constructions Dr. Sundaresan adopts here. *See* EX2012 [Markman Order] at 19-20 (citing '753 Patent (as "Ex. E") and '784 Patent (as "Ex. F"))).

Level of ordinary skill and claim interpretation are foundational aspects of any patentability analysis. "The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation." *Phillips v. AWH Corp.*, 415 F.3d at 1313. Moreover, "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* Thus, the starting point of any patentability analysis is interpreting the claims through the eyes of a person of ordinary skill and in light of the intrinsic record. As discussed above, Dr. Sundaresan's declaration adopts the opinions of others (i.e., Petitioner's attorneys

and the district court) without providing any evidence or analysis regarding claim interpretation or level of ordinary skill and without even considering the entire intrinsic record. Dr. Sundaresan's testimony is therefore entitled to no weight.

Moreover, these omissions prejudice Patent Owner. This is not a case where the Patent Owner Response raises a new claim construction argument that Petitioner was unaware of at the time of the Petition. Here, Dr. Sundaresan proposed and applied a construction for the "grid point" term in dispute and failed to provide evidence or analysis in support of his construction. Pet., 2-3; EX1003 [Sundaresan Decl.], ¶¶26-28. Petitioner's reply will likely attempt to introduce new arguments, evidence, and analysis in support of level of ordinary skill and claim construction that were required to be made in the Petition. At that point, Patent Owner has no ability in its sur-reply to introduce rebuttal evidence or opinions or alter the POR positions to account for Petitioner's new evidence and arguments.

Accordingly, Dr. Sundaresan's declaration should be given no weight.

D. Claim 2 Is Not Rendered Obvious By The Combination of Bhattacharya, Zeng, and Spain

Claim 2 of the '104 Patent, which depends from claim 1, further recites "wherein said database comprises previously-gathered calibration data for one or more *non-uniform grid points* within said region." EX1001, cl. 2 (emphasis added). Claim 2 is challenged only in Ground 2 and only based on disclosure in the Spain

reference (EX1007). Pet., 1, 68-70. Because, as explained below, Spain has no teaching or suggestion of this limitation under the proper construction, Petitioner fails to show that this combination renders obvious claim 2 of the '104 Patent.

As explained above in Section III.B, the proper construction for “[non-uniform] grid point” is “a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data.” Petitioner points to Spain’s disclosure of “partitioning a geographic region” as purportedly teaching this limitation, corresponding the partitioned locations to “one or more non-uniform grid points within said region.” Pet., 68-71 (citing EX1007, [0076]-[0082], [0099]).

The partitioned locations of Spain are fundamentally different from the non-uniform grid points of the '104 Patent because they are not based on analysis of calibration data. “Calibration data,” as correctly construed by the district court, is “modified or unmodified network measurement data associated with a geographic location.” EX2012 [Markman Order], 8; *see supra*, § III.A.

Spain determines the boundaries of its locations without evaluation of calibration data. Spain makes this clear in several ways. *First*, Spain explains that “the boundaries of each location are based, at least in part, on” factors that are ***not*** calibration data (i.e., not network measurement data). EX1007 [Spain], [0086]-

[0093]. These include “natural and man-made physical attributes of geographic region 220,” “legal laws governing geographic region 220,” “data regarding the location and movement of individuals ... and vehicles in geographic region 220,” and other similar factors:

[0086] In accordance with the illustrative embodiment, the boundaries of each location are based, at least in part, on:

[0087] i. natural and man-made physical attributes of geographic region **220** (e.g., buildings, sidewalks, roads, tunnels, bridges, hills, walls, water, cliffs, rivers, etc.),

[0088] ii. legal laws governing geographic region **220** (e.g., laws that pertain to the location and movement of people and vehicles, etc.),

[0089] iii. theoretical predictions and empirical data regarding the location and movement of individuals and groups of people and vehicles in geographic region **220**,

[0090] iv. the desired accuracy of the estimates made by location server **214**, and

[0091] v. patterns of the location and movement of people and vehicles within geographic region **220**,

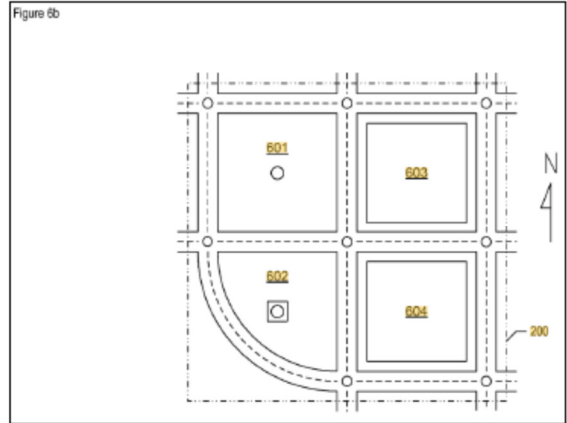
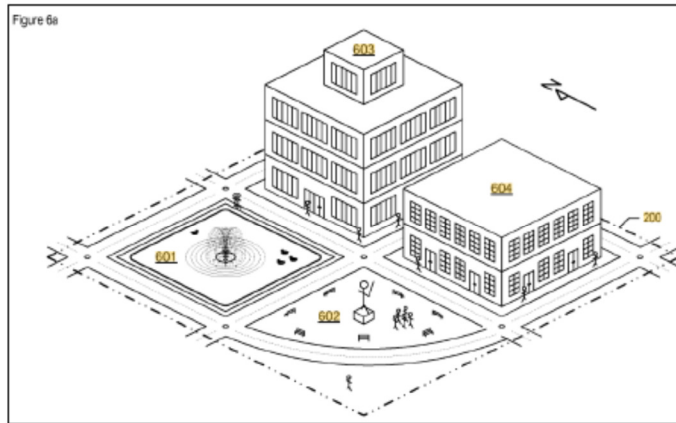
[0092] vi. the calendrical time T, and

[0093] vii. the environmental conditions N,

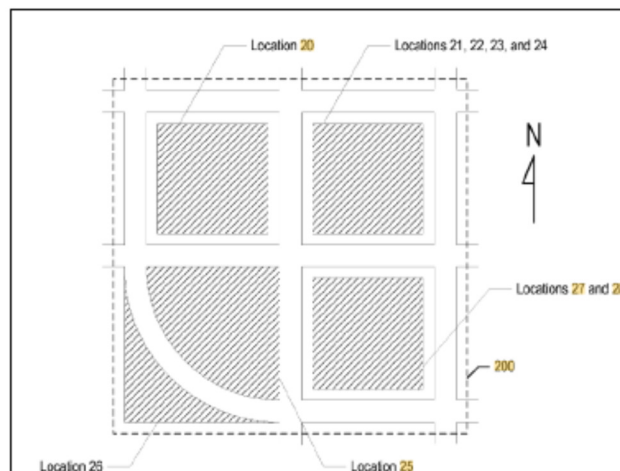
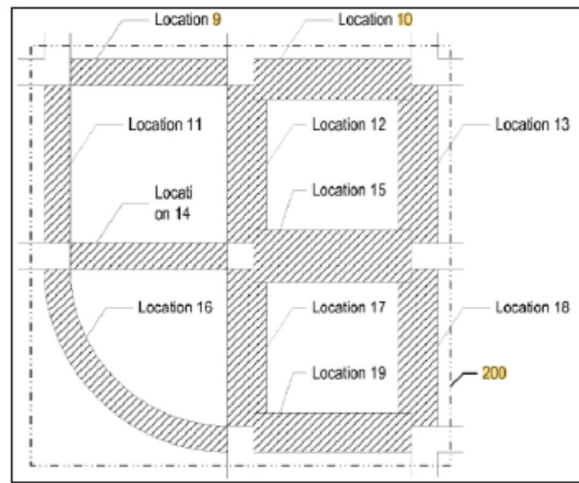
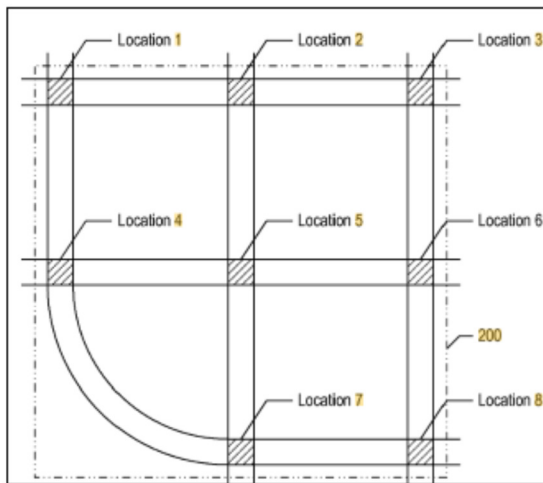
EX1007 [Spain], [0086]-[0093]. None of these factors are network measurement data, and thus they are not calibration data. EX2018 [Sturza Decl.], ¶¶130-131.

Spain also teaches that the partitioning may be based on considerations such as accuracy (*id.*, [0094]), computational burden (*id.*, [0095]) and “the ability of location server 214 to correctly determine when wireless terminal 201 is in one location or another.” *Id.*, [0096]. Again, the operator’s desired accuracy level (i.e., smaller or larger location size) and tolerance level for computational complexity (i.e., the tradeoff between computational burden increases as location sizes get smaller) are also not calibration data because they do not relate to network measurement data. EX2018 [Sturza Decl.], ¶132. Petitioner identifies nothing in Spain that teaches partitioning a region into locations based on any form of calibration data, or analysis of such data.

Second, Spain’s figures show that the partitioning is merely an overlay on a geographic region that is independent of any calibration data. Figures 6a-6k “depict geographic regions and their deconstruction into a plurality of locations.” EX1007 [Spain], [0020]. Petitioner relies on these figures as purportedly depicting non-uniform grid points. *See* Pet., 69-70 (citing. EX1007, Figs. 6a, 6e). These figures, however, further demonstrate that the partitioning is not based on an analysis of calibration data. EX2018 [Sturza Decl.], ¶133. For example, Figures 6c-6e show how the same region depicted in Figures 6a and 6b can be partitioned into a number of different locations without relying on calibration data:



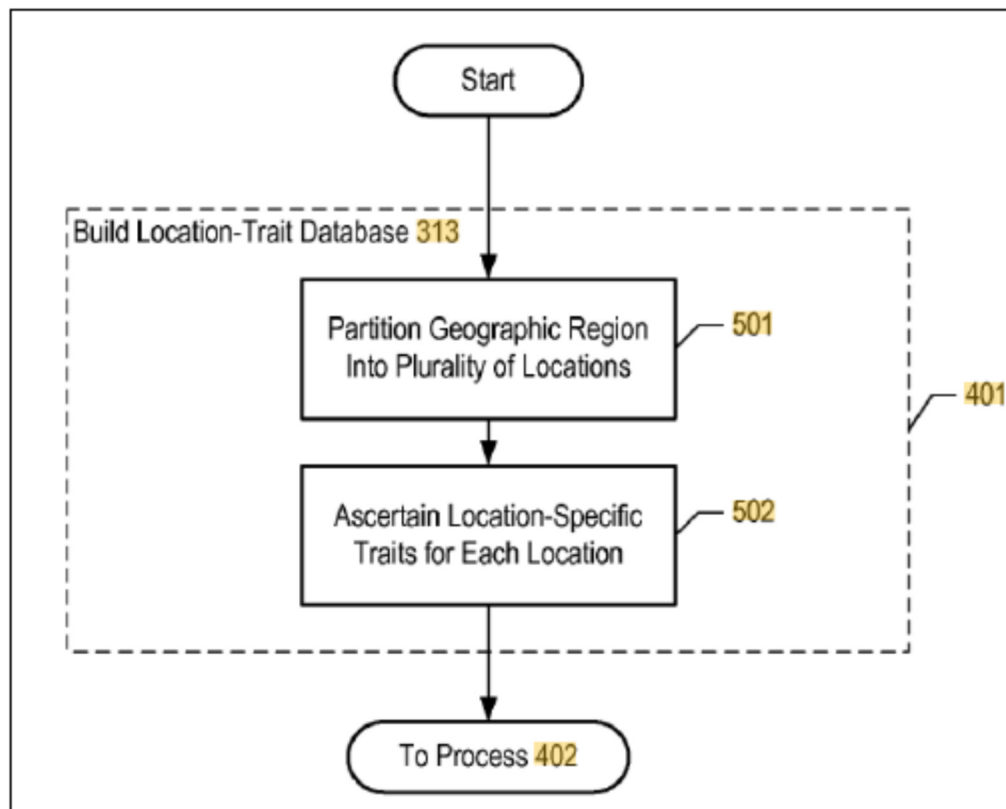
(region depicted in Figs. 6a and 6b)



(partitioning depicted in Figs. 6c-6e)

Spain explains that these figures show that “eight road intersections are partitioned into Locations 1 through 8” (Fig. 6c), “the street sections and their adjacent sidewalks up to the edge of [the] buildings ... are partitioned into Locations 9 through 19” (Fig. 6d), and various other parts of the region such as the “water fountain,” “park,” “and each floor of [a] building” are partitioned into additional locations (Fig. 6d). EX1007 [Spain], [0098]-[0099]. Thus, Spain’s partitioning is shown and described as merely assigning location identifiers to different physical attributes or characteristics of a region (*e.g.*, streets or intersections), amounting to no more than an overlay of identifiers onto a region. EX2018 [Sturza Decl.], ¶134. There is no analysis of calibration data being used to assign these identifiers. This is consistent with Spain’s teaching, discussed above, of partitioning a region into locations based on, *e.g.*, “natural and man-made physical attributes” rather than based on measured network signal data. *Id.*, [0086]-[0093].

Third, the flowchart in Figure 5 of Spain confirms that the partitioning is not based on analysis of calibration data (i.e., network measurement data), and thus the partitioned locations are not non-uniform grid points. Figure 5, reproduced below, “depicts a flowchart of the salient processes performed in accordance with ... building Location-Trait Database 313.” EX1007 [Spain], [0019], Fig. 5.



As seen in the figure, the partitioning of a geographic region into different locations occurs first at step 501 *before* location-specific “traits” are ascertained for each location in step 502. Even if these traits constitute calibration data, Spain teaches that the traits are ascertained for each location in step 502 *after* the partitioning has already occurred in step 501. *Id.*, Fig. 5. This confirms that the partitioning taught by Spain is not based on any analysis of these traits (or anything else that could constitute calibration data). EX2018 [Sturza Decl.], ¶135-136. That is, Spain’s Location-Trait Database 313 teaches to partition regions into locations and then assign them location-specific traits. Non-uniform grid points under the

proper construction are created by first evaluating calibration data and then partitioning the location based on that evaluation. Therefore, Petitioner's assertion that Spain's partitioned locations are a disclosure of "one or more non-uniform grid points within said region" is incorrect and should be rejected.

Petitioner relies on the "Bhattacharya-Zeng-Spain" combination for providing a "database representing expected signal-strength measurement" (Pet., 71) but, as discussed above, Petitioner relies on Spain's Location-Trait Database 313 for assigning traits. Spain only assigns traits to locations after the geographic location's shape and size has been determined. *See, e.g.*, EX1007 [Spain], Fig. 5, [0072]; EX2018 [Sturza Decl.], ¶137. The '104 Patent, on the other hand, starts with calibration data first and creates grid points of different shapes and sizes based on similarities in that calibration data. EX1001 ['104 Patent], 3:56-60.

Petitioner does not point to anything in Spain teaching evaluating calibration data to determine non-uniform grid points under the proper construction of non-uniform grid points. Accordingly, Petitioner fails to show that the combination of Bhattacharya, Zeng, and Spain renders obvious claim 2 of the '104 Patent.

V. CONCLUSION

For the reasons set forth above, Petitioner has not met its burden of proving claims 2, 4 and 6-10 of the '104 Patent are unpatentable by a preponderance of the evidence. The Board should therefore issue a final written decision finding claims 2, 4 and 6-10 patentable.

Date: August 23, 2024

Respectfully submitted,

By: / Stephen McBride /
Stephen McBride
Reg. No. 78,396
CARMICHAEL IP, PLLC
8607 Westwood Center Drive
Suite 270
Tysons, VA 22182
Email: stevemcbride@carmichaelip.com
Tel.: 703-646-9247

*Counsel for Patent Owner
Geoscope Technologies Pte. Ltd.*

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner's Response (the "POR") consists of 12,799 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The POR complies with the type-volume limitation of 14,000 words as mandated in 37 C.F.R. §42.24. In preparing this certificate, counsel has relied on the word count of the word-processing system used to prepare the paper (Microsoft Word).

Respectfully submitted,

/ Stephen McBride /

Date: August 23, 2024

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the following documents were served
by electronic service, by agreement between the parties, on the date below:

PATENT OWNER'S RESPONSE

EXHIBITS 2018-2035

W. Karl Renner
Roberto Devoto
Ryan Chowdhury
Usman A. Khan
FISH & RICHARDSON P.C.

Email: IPR50095-0137IP1@fr.com

Date: August 23, 2024

By: / Stephen McBride /
Stephen McBride
Reg. No. 78,396