

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.

Petitioner,

v.

GEOSCOPE TECHNOLOGIES PTE. LTD,

Patent Owner.

Case IPR2024-00032
U.S. Patent No. 8,786,494

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

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37 C.F.R. §42.104 38, 40

37 C.F.R. §42.61, 41

37 C.F.R. §42.6551

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	U.S. Patent No. 7,796,966 ("Bhattacharya '966 Patent")
2003	U.S. Patent No. 7,753,278 ("Spain '278 Patent")
2004	U.S. Patent No. 8,068,802
2005	U.S. Patent No. 7,257,414
2006	U.S. Patent No. 7,433,695
2007	U.S. Patent No. 7,734,298
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, 2023, <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 ("753 Patent")
2017	U.S. Patent No. 9,097,784 ("784 Patent")

2018	U.S. Patent No. 7,561,104 (“’104 Patent”)
2019	Manual of Patent Examining Procedure, Eighth ed., Rev. 9 (August 2012)
2020	U.S. Patent No. 8,400,358
2021	Prosecution History of U.S. Patent No. 8,400,358
2022	Declaration of Mr. Mark Alan Sturza (“Sturza Decl”)
2023	CV of Mr. Mark Alan Sturza
2024	U.S. Pat. Appl. Publ. No. 2003/0064735 (“Spain ’735”)
2025	U.S. Patent No. 7,706,811 (“Shkedi ’811”)
2026	Heikki Laitinen, Jaakko Lähteenmäki, Tero Nordström, “Database Correlation Method for GSM Location,” VTT Information Technology, IEEE, 2001. (“Laitinen”)
2027	U.S. Prov. Appl. No. 60/899,379 (“’379 Provisional”)
2028	Deposition Transcript of Dr. Karthikeyan Sundaresan for IPR2024-00031, IPR2024-00032, and IPR2024-00255
2029	Deposition Transcript of Dr. Karthikeyan Sundaresan for IPR2024-00259
2030	Disclaimer of claims 1, 25 and 35 of U.S. Pat. No. 8,786,494
2031	Business News Daily, “Location-Based Services: Definitions and Examples,” Max Friedman, Oct. 27, 2023 (last accessed July 28, 2024) (“Business News Daily”).
2032	Dictionary.com, “Geolocation Definition & Meaning,” <i>available at</i> www.dictionary.com/browse/geolocation (last accessed July 16, 2024) (“Dictionary.com”).
2033	“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”).
2034	“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”)

I. INTRODUCTION

U.S. Patent No. 8,786,494 (the “’494 Patent”) is directed towards a method to modify calibration data used to locate a mobile unit. EX1001 [’494 Patent], Title. Petitioner Apple Inc. (“Apple” or “Petitioner”) challenges claims 1-5, 9, 11, 12, 14-16, 18-22, 25, 27, 29, 31, 32 and 35. Pet., 1. PO has disclaimed challenged claims 1, 25 and 35. EX2030. Thus, claims 2-5, 9, 11, 12, 14-16, 18-22, 27, 29, 31 and 32 remain.

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 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, the expert 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.

Further, the definition of level of ordinary skill provided to Dr. Sundaresan is incorrect. A POSITA as defined by Petitioner's attorneys only has experience "working with navigation and/or geolocation systems." *Id.* However, the '494~~358~~ Patent and the asserted prior art are in the field of mobile telecommunications. EX1001 [494~~358~~ Patent], Title; EX1005 [Bhattacharya], [0001]; EX1006 [Spain], [0001]. While the fields of navigation and geolocation may have some overlap with mobile telecommunications, a person with experience in navigation and geolocation would not be expected to have the detailed knowledge of rf signals and cellular standards necessary for the field of mobile telecommunications. Accordingly, Petitioner's level of ordinary skill fails.

Finally, Petitioner has not shown that claims 4 and 15 are 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 prior art Spain reference Petitioner relies on for this limitation creates regions via reference to physical attributes (e.g., streets or

intersections) rather than evaluation of calibration data. Accordingly, the Board should find claims 4 and 15 not unpatentable.

II. OVERVIEW OF THE '494 PATENT AND THE STATE OF THE ART

A. Background of the Technology

The '494 Patent relates to the geolocation of mobile devices using RF signals and cellular technologies. EX2022 [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. EX2022 [Sturza Decl.], ¶51; EX2031 [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. EX2022 [Sturza Decl.], ¶51. The '494 Patent's mention of "public safety groups" (EX1001 at 1:24) 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 at 1:24-27. At the time of the invention, "there [was] a

longstanding problem of providing high accuracy location data for mobile devices, such as mobile telephones.” EX2022 [Sturza Decl.], ¶52; EX2025 [Shkedi ’811] at 1:19-21. One way a mobile device can be geolocated is by using a GPS receiver. This GPS-based location could then be transmitted to a base station or used locally on the device. However, there are many situations where GPS information is not available or not reliable. In those situations, the mobile device can still use other information (such as an identification of nearby base stations and the strength of the signals received from each nearby base station) to assist in determining the mobile device’s location. EX2022 [Sturza Decl.], ¶52.

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. Many methods attempted to use RF signals to geolocate mobile devices, but generally had problems, including limited accuracy. *See* EX2022 [Sturza Decl.], ¶54; EX2024 [Spain ’735], [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* EX2025 [Shkedi ’811], 1:39-57; EX2026 [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.”).

Some systems, like the '494 Patent, relied on collecting “calibration data” from mobile devices moving through various geographic regions by saving this information into a “calibration database.” EX1001 at 1:28-32, 1:43-47. 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 to determine its location. EX2022 [Sturza Decl.], ¶55. Various methods can be used for this comparison which involves both the calibration data and the observed data. *Id.*

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). EX2022 [Sturza Decl.], 56. 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. *Id.* This allows the mobile device to determine its location even without GPS. *Id.*

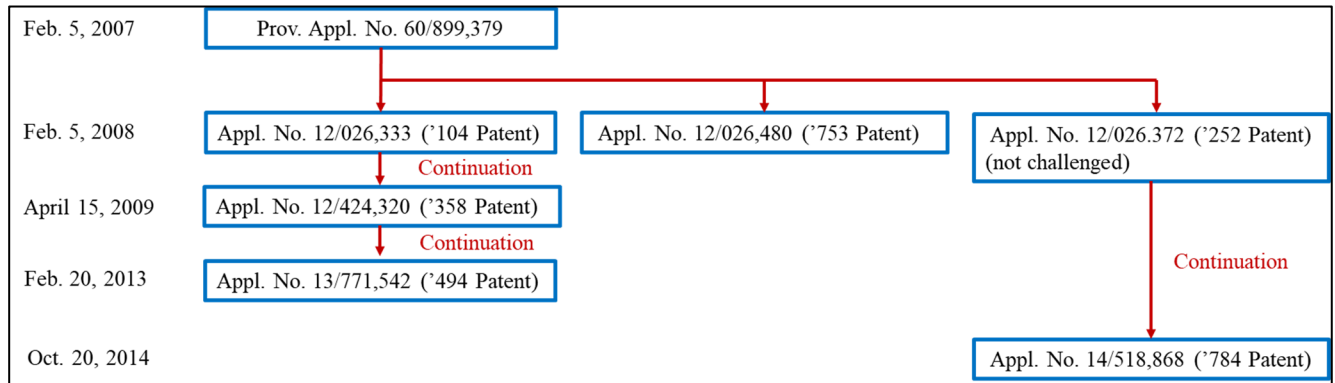
There are a number of reasons calibration data may not correspond to the data observed by a mobile device at the time it is seeking its location, even where the same base stations are involved. For example, variations in the environment (e.g., weather) can affect the observed data. EX2022 [Sturza Decl.], 57. One potential reason for discrepancies is that the mobile device was indoors when it collected the observed data.

B. The '494 Patent

The '494 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 at 1:53-61; EX2022 [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. EX1001 at cl. 1. The observed network measurement data is then modified to account for varying conditions and other variables that may be caused by, for example, environmental factors or signals propagating indoors. EX1001 at 3:52-58; EX2022 [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 at 3:52-58; EX2022 [Sturza Decl.], ¶59.

The invention of the '494 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 at 1:40-47, 9:46-50; EX2022 [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.” EX1001 at 1:31-39. However, geolocation within a building—using observed data collected indoors—is often desirable. EX1001 at 1:31-39; EX2022 [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 at 1:31-39; EX2022 [Sturza Decl.], ¶60. To solve this problem, the '494 Patent independent claims are directed to modifying the observed data measured by a mobile device to eliminate disparities with previously-gathered calibration data. EX1001 at cl. 1. The specification describes at length what these modifications may entail and how they are performed. EX1001 at 5:15-55, 6:1-6:62, 6:63-7:30; EX2022 [Sturza Decl.], ¶60.

The '494 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 of the '494 Patent

Dependent claims 4 and 26 of the '494 Patent further recite the use of what the patent refers to as “non-uniform grid points.” As explained below, the claimed grid points of the '494 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. EX2022 [Sturza Decl.], ¶¶62. The grid points serve as additional known locations associated with

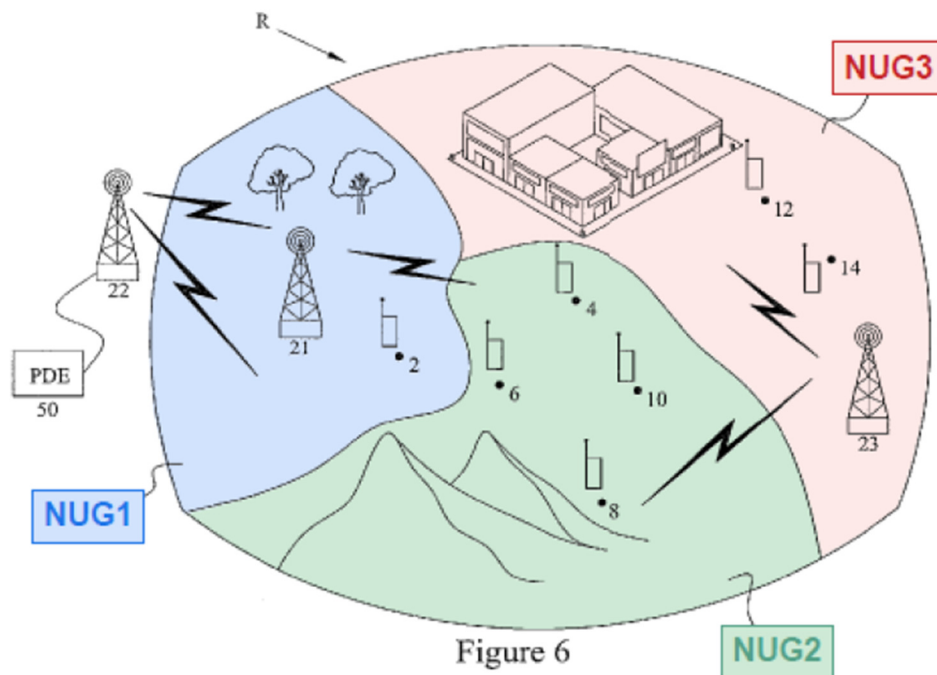
signal information, creating a denser “map” for mobile devices to compare observed data for the purpose of determining their location.

The grid points of the ’494 Patent “usually will not be uniformly distributed throughout the geographic region,” and thus the ’494 Patent (and related patents) uses the term “non-uniform grid points” or “NUGs” when describing grid points. EX2016 [’753 Patent], 2:43-50; *see also* EX1001 at 3:59-4:2; EX2022 [Sturza Decl.], ¶63.¹ The claimed grid points “represent an area of collected calibration

¹ U.S. Patent No. 8,406,753 (EX2016 [’753 Patent]; “’753 Patent”) and U.S. Patent No. 9,097,784 (EX2017 [’784 Patent]; “’784 Patent”) claim priority to the same provisional application (U.S. Provisional Application No. 60/899,379 (EX2027 [’379 Provisional]; “’379 Provisional”) as the ’494 Patent, and describe “grid points” as the term is used in this patent family. The ’379 Provisional is incorporated by reference in the ’494 Patent (EX1001 at 1:12- 16) and includes disclosures regarding “grid points” that are also found in the ’753 and ’784 Patents. See EX2027 [’379 Provisional] at 5-7. Thus, in the Related Litigation, the district court relied on disclosures in the ’753 Patent and ’784 Patent in construing the term “grid point.” See EX2012 [Markman Order], 19-20 (citing ’753 Patent (as “Ex. E”) and ’784 Patent (as “Ex. F”)).

data” and “represent the signal characteristics and/or calibration data over a given region.” EX1001 at 3:59-4:2; EX2022 [Sturza Decl.], ¶63.

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); EX2022 [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; EX2022

[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; EX2022 [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.” EX2022 [Sturza Decl.], ¶66. This is because the boundaries of each grid point are defined by the calibration data itself. EX2027 [’379 Provisional], 7; EX2016 [’753 Patent], 12:7-14; EX2022 [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; EX2022 [Sturza Decl.], ¶66. Until that evaluation, the boundaries are undefined and the claimed grid point does not exist. EX2022 [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. EX2022 [Sturza Decl.], ¶66.

This is stated explicitly in the '379 Provisional incorporated by reference in the '494 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.*

EX2027 ['379 Provisional], 7 (emphasis added); *see also* EX1001 at 1:12-16 (stating that the '379 Provisional is “incorporated by reference in its entirety” in the '494 Patent); EX2022 [Sturza Decl.], ¶66.

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); EX2022 [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. EX2022 [Sturza Decl.], ¶67. The '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); EX2022 [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. EX2027 [’379 Provisional], 6-7; EX2016 [’753 Patent], 10:44-59; EX2022 [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. EX2027 [’379 Provisional], 6-7; EX2016 [’753 Patent], 10:66- 11:6; EX2022 [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. EX2027 [’379 Provisional], 6; EX2016 [’753 Patent], 10:66-11:6, 12:4-14; EX2022 [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. EX2022 [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. EX2027 [’379 Provisional], 6; EX2016 [’753 Patent], 10:46-47; EX2022 [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. EX2027 [’379 Provisional], 6; EX2016 [’753 Patent], 10:55-59; EX2022 [Sturza Decl.], ¶69. If, however, these clusters of data are determined to be “sufficiently different,” then they are allocated to different grid points. EX2027 [’379 Provisional], 6; EX2016 [’753 Patent], 10:50-55; EX2022 [Sturza Decl.], ¶69. 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. EX2027 ['379 Provisional], 7; EX2016 ['753 Patent], 12:9-14; EX2022 [Sturza Decl.], ¶69.

C. Challenged Claims

The Petition challenges claims 1-5, 9, 11, 12, 14-16, 18-22, 25, 27, 29, 31, 32, and 35 of the '494 Patent. PO has filed a statutory disclaimer of claims 1, 25 and 35. EX2030. Accordingly, Patent Owner's Response focuses exclusively on claims 2-5, 9, 11, 12, 14-16, 18-22, 27, 29, 31 and 32 of the '494 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]; EX2022 [Sturza Decl.], ¶70; EX2028 [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." EX1005 [Bhattacharya], Abstract. This estimation is

performed by location system 212. EX1005 [Bhattacharya], [0059], [0064], [0065], Figs. 2-18; EX2028 [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.* at [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.* at [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.* at [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.* at [0207].

2. Spain

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.”

EX2003 [Spain '278 Patent], 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.* at [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.* at [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.* at [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**,

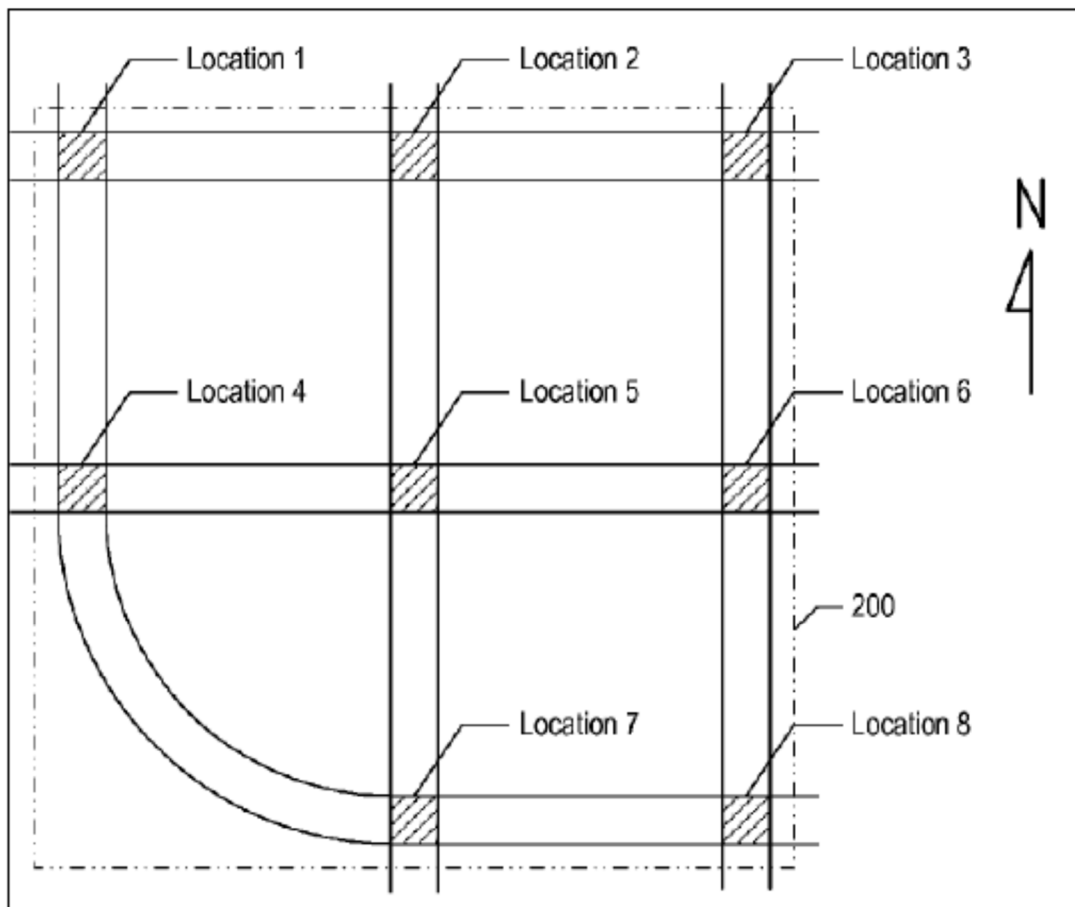
[0092] vi. the calendrical time *T*, and

[0093] vii. the environmental conditions *N*,

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

Thus, the partitioning in Spain is not based on calibration data such as measured strengths of network signals. Rather, as is apparent from this disclosure, the partitioning is based on environmental conditions that are independent of any

calibration data. EX2022 [Sturza Decl.], ¶¶72-73. 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. at Fig. 6c; *see also id.* at 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.* at [0094]-[0097].

3. Meunier

Meunier is directed to a specific mobile device that includes a motion detector, a memory, a location detection module, and a location correction module. EX1007 [Meunier], [0006]. The location correction module applies a statistical correction to the measured wireless signal strength determined by the location detection module when the motion detector detects that the mobile device is moving less than a threshold amount. *Id.* The mobile device, according to another aspect of the invention, includes an orientation detector for determining orientation of the mobile device, which can aid in determining the location of the mobile device. *Id.* at [0009]. Motion and orientation detectors that are part of a mobile device are used to avoid a time-consuming calibration process and to help predict future locations based on current movement and direction. *Id.* at [0019]-[0020].

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. Indeed, 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.], ¶¶46-49. The ’494 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 IPR2024-01212 involving the ’494 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., IPR2024-01212, Paper 2 (Petition), at 13. EX2022+8 [Sturza Decl.], ¶46. However, as Petitioner’s attorneys point out, 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*. EX2022+8 [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” and mentioned that the parties in the litigation had “jointly stipulated that the ‘collecting’ (feature [1.3]) has to occur before the ‘modifying’ (feature [1.5]) and that the modifying has to occur before the ‘comparing’ (feature [1.6]).” Pet., 2-3. (“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”); EX2028 [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 adopted the undisputed claim constructions but declined to construe any other term “because doing so would have no effect on our analyses below.” D.I., 10. 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.*, 38.

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 '494 Patent specification specifically incorporates the '379 Provisional by reference. EX1001 ['494 Patent], 1:6-16; *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 ’494 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 [’494 Patent], 1:28–3:15, 12:11-22. “Calibration data” includes network measurement data such as “signal strength, round trip time, time difference of arrival (TDOA), etc.” *Id.*, 1:28-31. The ’494 Patent similarly describes the calibration database as “a collection of data from . . . grids that contain network measurements with associated location estimates.” EX1001 [’494 Patent], 10:66–

11:2. *See, e.g., id.*, 1:54-57. Thus, “calibration data” is “network measurement data associated with a geographic location.” EX2022 [Sturza Decl.], ¶¶80.

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 15)	“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.

As discussed above, the district court construed “grid point” as “a point associated with representative calibration data for an area,” EX2012 [Markman Order], 18-20. 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.*, 38.

The Board found that the district court’s construction of “grid point” does not require the claimed grid points to be “generated based on the measured

calibration data.” *Id.*, 41. 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.1; EX2022 [Sturza Decl], ¶¶83. 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; EX2022 [Sturza Decl], ¶¶84.

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 ’494 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 EX2018 [’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. EX2022 [Sturza Decl.], ¶¶86.

Further, the district court construction requires that a “grid point” must be associated with calibration data that is *representative for an area*. EX2022 [Sturza Decl.], ¶¶87. 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. EX2022 [Sturza Decl.], ¶¶87. The ’379 Provisional—which is incorporated by reference in the ’494

Patent (EX1001 [’494 Patent], 1:6-14)—and the related ’753 Patent describe this as involving the evaluation of statistical similarities across the set of calibration data gathered within a region, and teach examples of the statistical analyses used to generate the claimed grid points from this calibration data. EX2027 [’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; EX2022 [Sturza Decl.], ¶¶87. Similarly, the ’379 Provisional and ’753 Patent teach examples of the statistical analyses used to generate the claimed grid points from this calibration data. EX2027 [’379 Provisional], 6; EX2016 [’753 Patent], 10:66-11:6; EX2022 [Sturza Decl.], ¶¶87. There is no dispute that what may constitute representative calibration data for an area is a subset of the calibration data that is collected through a broader region. EX2022 [Sturza Decl.], ¶¶87; *see also* 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)); EX2018 [’104 Patent], 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. EX2022 [Sturza Decl.], ¶88. 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. EX2022 [Sturza Decl.], ¶88. 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. EX2022 [Sturza Decl.], ¶89.

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., 40-41. 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”).

Moreover, 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. EX2022 [Sturza Decl.], ¶90. 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. EX2027 [’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); EX2022 [Sturza Decl.], ¶90. 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.” EX2027 ['379 Provisional], 6; EX2022 [Sturza Decl.], ¶90. 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; EX2022 [Sturza Decl.], ¶90.

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

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 38.

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.A.1. And this requirement is similarly applicable to “non-uniform grid points.” *Id.*

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 [’494 Patent], cls. 15, 26; EX2022 [Sturza Decl.], ¶94. Further, challenged claim 15 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.*, cl. 15;
EX2022 [Sturza Decl.], ¶¶94.

The intrinsic record also requires Patent Owner’s proposed construction of “non-uniform grid point.” EX2022 [Sturza Decl.], ¶¶95. The ’494 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 [’494 Patent], 3:58-61; EX2022 [Sturza Decl.], ¶¶95. 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. EX2022 [Sturza Decl.], ¶¶95. 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.***

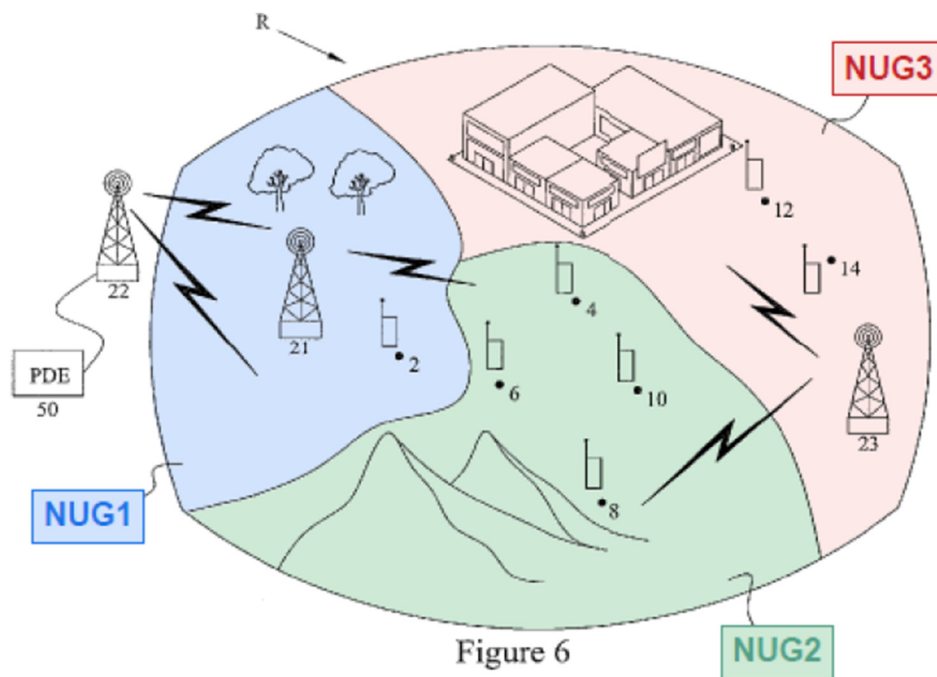
EX2027 [’379 Provisional], 7 (emphasis added); *see also* EX1001 [’494 Patent], 1:6-14 (stating that the ’379 Provisional is “incorporated by reference in [its] entirety” in the ’494 Patent); EX2022 [Sturza Decl.], ¶¶95.

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); EX2022 [Sturza Decl.], ¶¶96.

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; EX2022 [Sturza Decl.], ¶¶97.

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; EX2022 [Sturza Decl.], ¶¶98; *see also supra* § II.B.1 (further describing the claimed grid points of the '494 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.”); EX2022 [Sturza Decl.], ¶¶98.

Because non-uniform grid points “represent an area of collected calibration data” (EX1001 ['494 Patent], 3:63-67)—and thus are associated with representative calibration data for an area—the boundaries of this area must be defined. Rather than these boundaries being predefined without consideration of the calibration data, the boundaries are determined based on evaluation of the calibration data. EX2027 ['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.”); EX2022 [Sturza Decl.], ¶99; *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. EX2027 [’379 Provisional], 6; *see also* EX1001 [’494 Patent], 1:6-15; EX2022 [Sturza Decl.], ¶100. The ’379 Provisional further explains that the data is evaluated “using increasingly stringent tests of statistical sufficiency.” EX2027 [’379 Provisional], 6. 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. EX2027 [’379 Provisional], 6-7; EX2022 [Sturza Decl.], ¶100. Multiple methods of evaluating statistical similarities across the calibration data may be used to allocate calibration data to different grid points. EX2027 [’379 Provisional], 6 (referring to “clustering tests” and “K-means algorithm”). For example, calibration data is evaluated to

determine whether it “exhibit[s] clustering.” EX2027 [’379 Provisional], 6; EX2022 [Sturza Decl.], ¶100. 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. EX2027 [’379 Provisional], 6; *see also* EX2022 [Sturza Decl.], ¶100.

The result of this evaluation and allocation of data to each non-uniform grid point is that each has “statistically similar data accumulated into itself”—*i.e.*, each claimed grid point is associated with representative calibration data for an area. EX 2027[’379 Provisional], 7; *see also* EX2022 [Sturza Decl.], ¶101. 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. EX2022 [Sturza Decl.], ¶101. 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. EX2027 [’379 Provisional], 7; *see also* EX2022 [Sturza Decl.], ¶101. The related ’753 Patent reiterates this as well. EX2016 [’753 Patent], 10:66-11:6, 12:7-14; EX2022 [Sturza Decl.], ¶101.

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 ’ Patent means “a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data.”

EX2022 [Sturza Decl.], ¶102. 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.”). For Petitioner to meet its burden, the Petition must resolve the level of ordinary skill in the pertinent art.

Indeed, resolving the level of ordinary skill is necessary to understand and apply 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 example, ground 1A challenges claims 1, 2, 5, 9, 12, 14, 16 and 18-22. *Id.* Ground 1A relies on a POSITA’s level of ordinary skill for multiple issues, including the understanding of a POSITA with respect to cellular technologies. *See, e.g., Pet.*, 10 (“A POSITA would have understood that the “signal-strength measurements” contained in Bhattacharya’s ‘Signal-Strength Measurement Reports’ would have been received, at least in part, from the well-known reception of NMRs standard in cellular radio networks (e.g., GSM)”; (“Because NMRs are sent as a part of these various wireless standards ... a POSITA would have utilized the signal-strength measurements contained in these NMRs, because they would provide the information required by Bhattacharya without the need to further add data or messages to the existing cellular radio networks.”), 15 n.4 (“A POSITA would have understood and found obvious that embodiments of Bhattacharya that use GPRS packets for communication are not subject to saturation”). *See, e.g., id.*, 14, 19, 37-39.

In addition, Grounds 1B-1D in the Petition are each obviousness grounds under 35 U.S.C. §103 combining Bhattacharya with Spain and/or Meunier. Pet., 1. 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.* Thus, in addition to the other reasons discussed above for ground 1A, the Petition must resolve the level of ordinary skill as part of the object analysis required by *Graham* and *KSR*.

The Petition does not address the level of ordinary skill. Instead, it references Dr. Sundaresan’s expert declaration. *See* Pet., 6 (referencing, in a footnote, EX1003, ¶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 in *Graham* and *KSR*, an analysis of the level of ordinary skill in the pertinent art is required for

determining obviousness. *Graham* at 1, 17-18; *KSR* at 399. Without such an analysis, the Petition cannot carry its burden.

Indeed, the PTAB's rules expressly 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."). The Federal Circuit has repeatedly affirmed the Board's enforcement of 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 applicable statutes, rules, and appellate 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. Indeed, 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 any analysis supporting the definition he was provided. Thus, Dr. Sundaresan is not providing his *opinion* on level of ordinary skill, he is

adopting attorney argument provided by Petitioner without providing any analysis or evidence in support. Because Dr. Sundaresan's statement simply adopts the position of Petitioner's attorneys, it does not constitute "evidence or opinions" (35 U.S.C. §312(a)(3)(B)) and is entitled to no weight. *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"); *Xerox Corp. et al. v. Bytemark, Inc.*, IPR2022-00624, Paper 12 (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*. 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 field of pertinent art is. These defects require the Board to find all challenged claims not unpatentable.

B. Petitioner's Level of Ordinary Skill Is Deficient

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 does not have the background to draw necessary inferences regarding the operation of cellular systems to argue that Bhattacharya anticipates (as argued in ground 1A) or to combine the Bhattacharya and Spain references (as in grounds 1B-D).

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. As discussed above, this POSITA lacks any background working with cellular standards or technologies.

The '494 patent and asserted references are all directed to telecommunications and cellular technology. EX2027 ['379 Provisional], [0001] ("The present invention relates to telecommunications in general"); EX1005, [0001] ("The present invention relates to telecommunications in general ..."); EX1006, [0001] ("The present invention relates to telecommunications in general ..."); EX1008 [0001] ("This invention relates generally to a method for

determining the proximity of mobile devices in a wireless network.”). Like Meunier, 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”). As such, someone seeking to combine these references would need significant experience working with cellular technologies. EX2022 [Sturza Decl.], ¶108.

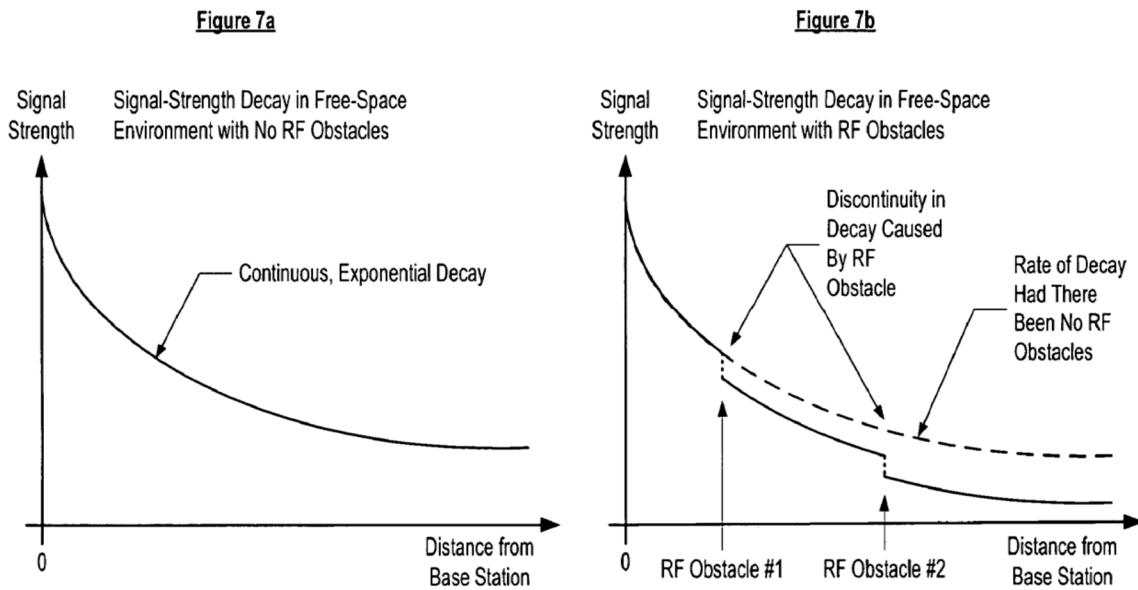
A POSITA as defined by Petitioner’s attorneys has no experience in cellular technologies or telecommunications. EX1003 [Sundaresan Decl.], ¶8; EX2022 [Sturza Decl.], ¶109. A person with two years’ experience with navigation and geolocation would not be familiar with cellular standards or concepts such as expected signal strength functions in wireless mobile networks. EX2022 [Sturza Decl.], ¶109. These are not trivial concepts; wireless standards are debated and revised by experts in the field for years before being adopted. EX2022 [Sturza Decl.], ¶109.

The Petition, in discussing Bhattacharya, repeatedly relies on a POSITA’s knowledge to support inferences regarding cellular standards. *See, e.g., See, e.g.,* Pet., 10 (“A POSITA would have understood that the “signal-strength

measurements” contained in Bhattacharya’s ‘Signal-Strength Measurement Reports’ would have been received, at least in part, from the well-known reception of NMRs standard in cellular radio networks (e.g., GSM)”); (“Because NMRs are sent as a part of these various wireless standards ... a POSITA would have utilized the signal-strength measurements contained in these NMRs, because they would provide the information required by Bhattacharya without the need to further add data or messages to the existing cellular radio networks.”), 15 n.4 (“A POSITA would have understood and found obvious that embodiments of Bhattacharya that use GPRS packets for communication are not subject to saturation ...”). *See, e.g., id.*, 14, 19, 37-39. But the Petition is discussing complex cellular concepts that a POSITA under Petitioner’s definition lacks any experience with. EX2022 [Sturza Decl.], ¶110. For example, GSM and GPRS are cellular standards. EX2022 [Sturza Decl.], ¶110. These standards are designed for mobile telecommunications purposes (e.g., transmitting and receiving voice and data), not geolocation. EX2022 [Sturza Decl.], ¶110. Petitioner argues that NMRs are “well-known”, but Bhattacharya is talking about a person with experience in GSM or similar cellular technologies, they would not be well-known to a POSITA with experience in navigation and geolocation. EX2022 [Sturza Decl.], ¶110. A POSITA using Petitioner’s attorneys’ definition would have no basis to “have understood and

found obvious that, embodiments of Bhattacharya that use GPRS packets for communication are not subject to saturation.” Pet., 15 n.4; EX2022 [Sturza Decl.], ¶110. Indeed, a POSITA under Petitioner’s attorneys’ definition may never have heard of a GPRS packet or the concept of saturation. EX2022 [Sturza Decl.], ¶110.

Similarly, for grounds 1B to 1D, Petitioner repeatedly relies on its attorneys’ definition of POSITA to explain why cellular concepts from Bhattacharya and Spain should be combined. Pet., 45-50. For example, Petitioner argues that “Bhattacharya describes generation of expected-signal strength functions as ‘well-known’”, citing to Bhattacharya paragraph [0112]. Pet., 49. But Bhattacharya paragraph [0112] and the surrounding text is discussing calculating “the expected signal strength of an electromagnetic signal” [e.g., an rf signal] at various distances from a transmitter and how it could be impacted obstacles. *Id.*, [0112]-[0114]. Cellular systems generally generate expected signal strength functions to maximize radio frequency signal coverage for mobile phones. EX2022 [Sturza Decl.], ¶111. Thus, they are developed by individuals with experience in cellular technology for applications in cellular technology. EX2022 [Sturza Decl.], ¶111. Bhattacharya Figs. 7a and 7b make this clear:



EX1005 [Bhattacharya], Figs. 7a and 7b. *See also id.*, [0113] (referencing Figs. 7a and 7b to explain expected signal strength functions); [0033] (“Fig. 7a depicts a graph that illustrates how the signal strength of an electromagnetic signal decreases, in general, as a function of the distance from the transmitter and in an environment with no radio frequency obstacles.”); [0034] (“Fig. 7b depicts a graph that illustrates how that the signal strength of an electromagnetic signal decreases, in general, as a function of the distance from the transmitter and in an environment with two radio frequency obstacles.”). Terms like “signal-strength decay,” “RF obstacles” and “Base Station” are specific to radio frequency and cellular technologies. EX2022 [Sturza Decl.], ¶112. A person expected to build expected signal-strength functions using Figs. 7a and 7b and the disclosure at Bhattacharya

[0112]-[0117] needs significant experience with radio frequency and cellular technologies. EX2022 [Sturza Decl.], ¶112.

Bhattacharya goes on to explain that the “expected signal-strength functions ... are generated based on a combination of ... a plurality of theoretical radio-frequency propagation models, and ... a plurality of empirical signal-strength measurements.” *Id.*, [0115]-[0117]. These are cellular concepts. EX2022 [Sturza Decl.], ¶113. While it is debatable whether constructing “theoretical radio-frequency propagation models” or performing “empirical signal-strength measurements” of rf signals would be “well-known” to a person with experience in cellular technology, they certainly would not be well-known to a person with two years of experience in navigation and geolocation and no experience with cellular technology. EX2022 [Sturza Decl.], ¶113.

Petitioner relies on a POSITA’s supposed knowledge of “well-known” expected signal strength functions used by cellular technologies in arguing to combine Bhattacharya and Spain. *See, e.g.*, Pet., 46 (“a POSITA looking to implement Bhattacharya’s teachings to look beyond its disclosure [of expected signal strength functions] to well-known techniques ... for generating and using expected [signal strength] values to account for time-dependent changes based on atmospheric and meteorological conditions.”); 46-47 (“a POSITA would have

found obvious that Bhattacharya's expected signal-strength measurements (stored in an expected signal-strength database) correspond to Spain's expected values"); 47-48 ("A POSITA, therefore, would have recognized that prior generation of expected [signal strength] values and storage of those values in the database (as distinguished from generating these values at the same time point as measurement by a wireless terminal of values for estimating its location) ensures that the location server is not slowed down in performing location estimation..."). *See, e.g., id.*, 45-50, 83. In each case, Petitioner is attempting to combine complex cellular concepts relating to theoretical modelling of expected signal strengths to arrive at the claimed invention. EX2022 [Sturza Decl.], ¶114; EX1005 [Bhattacharya], [0112]-[0117].

Similarly, for Bhattacharya and Meunier, Petitioner relies on cellular "signal-strength measurements of wireless communications with nearby base stations." Pet., 67. *See, e.g., id.*, 68 ("A POSITA would have perceived Meunier to be pertinent to improving the reliability of Bhattacharya's system, e.g., to take into account environmental factors (e.g., movement of people or large objects) and signal strength data that varies with device orientation."); 71 ("As discussed above, a POSITA would have also implemented the Bhattacharya-Meunier terminal to monitor signal-strength measurements from nearby base stations, and in certain

scenarios, perform statistical correction (e.g., by computing average signal strength values for the nearby base stations)"); 71 n.14 ("A POSITA would have understood and found obvious that Meunier may be readily combined with location detection systems using well-known wireless network radio signals ..."). *See generally id.*, 67-74. Indeed, Petitioner devotes a section to explaining why a POSITA with no background in cellular technologies would allegedly understand how to modify the "Average Signal Strength" measurements disclosed in Bhattacharya. Pet., 71-74. A POSITA as defined by Petitioner's attorneys has no knowledge of cellular or rf technology and thus would not understand how to combine the cellular functionality of the asserted references. EX2022 [Sturza Decl.], ¶115.

Accordingly, Petitioner's attorneys' POSITA lacks the level of skill to make inferences about Bhattacharya's teachings (as argued in ground 1) or to combine the Bhattacharya and Spain references (as in ground 2).

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* §IV.A, *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.,* Dr. Sundaresan adopts the claim constructions from the district court’s Markman Order as his own. EX1003

[Sundaresan Decl.], ¶29; EX2028 [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. EX2028 [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.” EX2028 [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:

- EX2028 [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 ’494 Patent incorporates Provisional Application No. 60/899,379 by reference. EX1001 [’494 Patent], 1:6-16; *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

³ Patent Owner submits the ’379 Provisional with this POR as Exhibit 202729.

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.” EX2028 [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 from 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.” EX2028 [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. EX2028 [Sundaresan Dep. Tr.], 65:1-15.

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 ’494 Patent and expressly incorporated by reference in its entirety into the intrinsic record. EX1001 [’494 Patent], (60), 1:6-16. 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. Claims 3, 4 and 15 Are Not Rendered Obvious By Bhattacharya and Spain

Claims 3 and 4 depend from independent claim 1 and claim 15 depends from independent claim 14. Claim 3 claims “The method of claim 2 wherein said previously-gathered calibration data at one or more predetermined calibration points is combined to form previously-gathered calibration data for one or more non-uniform grid points within said region.” EX1001 [’494 Patent], cl. 3. Claims 4 and 15 claim “The method of claim [1/14] wherein said database comprises previously-gathered calibration data for one or more non-uniform grid points within said region.” EX1001 [’494 Patent], cls. 4, 15. Claims 3, 4 and 15 are challenged only in ground 1B (Bhattacharya and Spain). Pet., 1, 58-61, 63.

As explained above in Section 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.” The Petition relies on Spain for “non-uniform grid point” limitation. Pet., 58-61 Spain does not teach this limitation under the proper construction. The partitioned locations of Spain are fundamentally different from the non-uniform grid points of the ’494 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). EX1006 [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

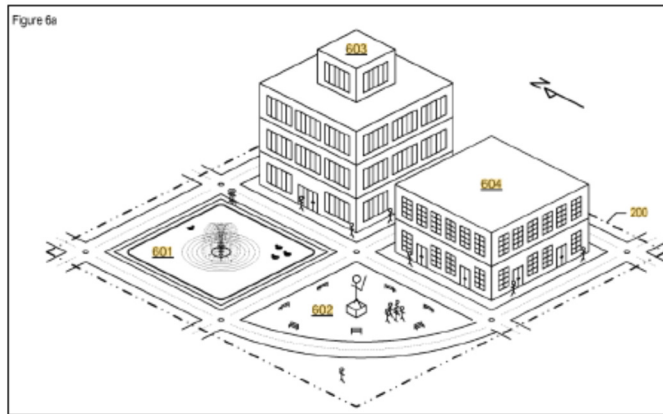
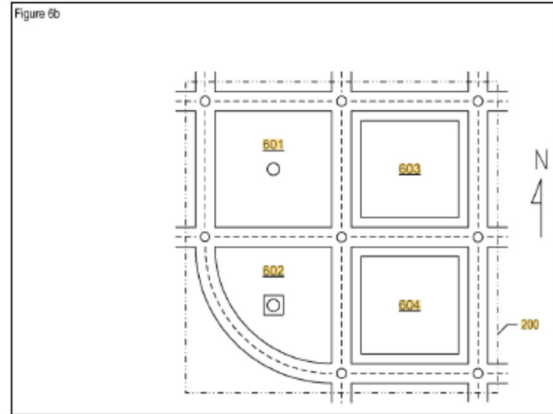
[0093] vii. the environmental conditions *N*,

EX1006 [Spain], [0086]-[0093]. None of these factors are network measurement data, and thus they are not calibration data. EX2022 [Sturza Decl.], ¶119.

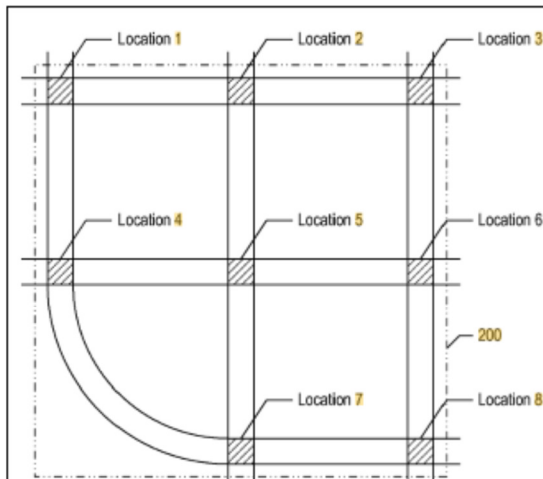
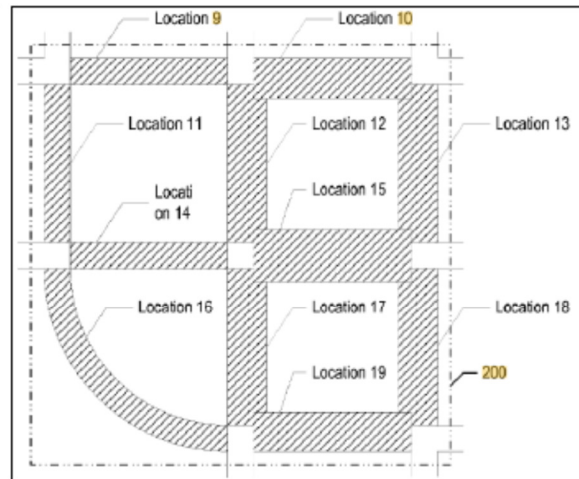
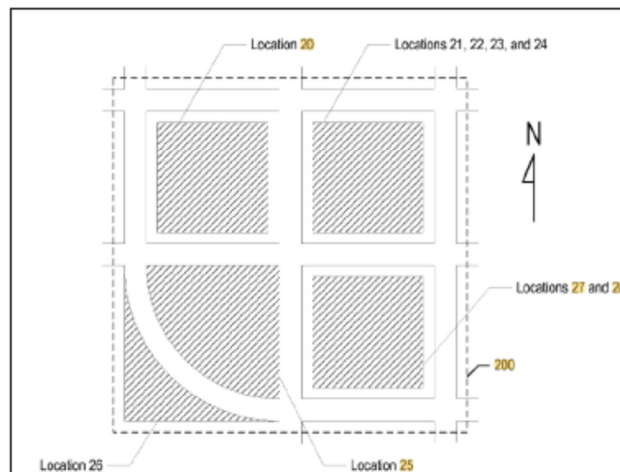
Spain also teaches that the partitioning may be based on considerations such as accuracy (*id.*, [0094]), computational burden (*id.*, [0095]) and “the ability of location server 214 to correctly determine when wireless terminal 201 is in one location or another.” *Id.*, [0096]. Again, the operator’s 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 calibration data because they do not relate to network measurement data. 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." EX1006 [Spain], [0020]. Petitioner relies on these figures as purportedly depicting non-uniform grid points. *See* Pet., 64 (citing. EX1006 [Spain], Fig. 6E). The figures in Spain, however, further demonstrate that the partitioning is not based on an analysis of calibration data. 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:



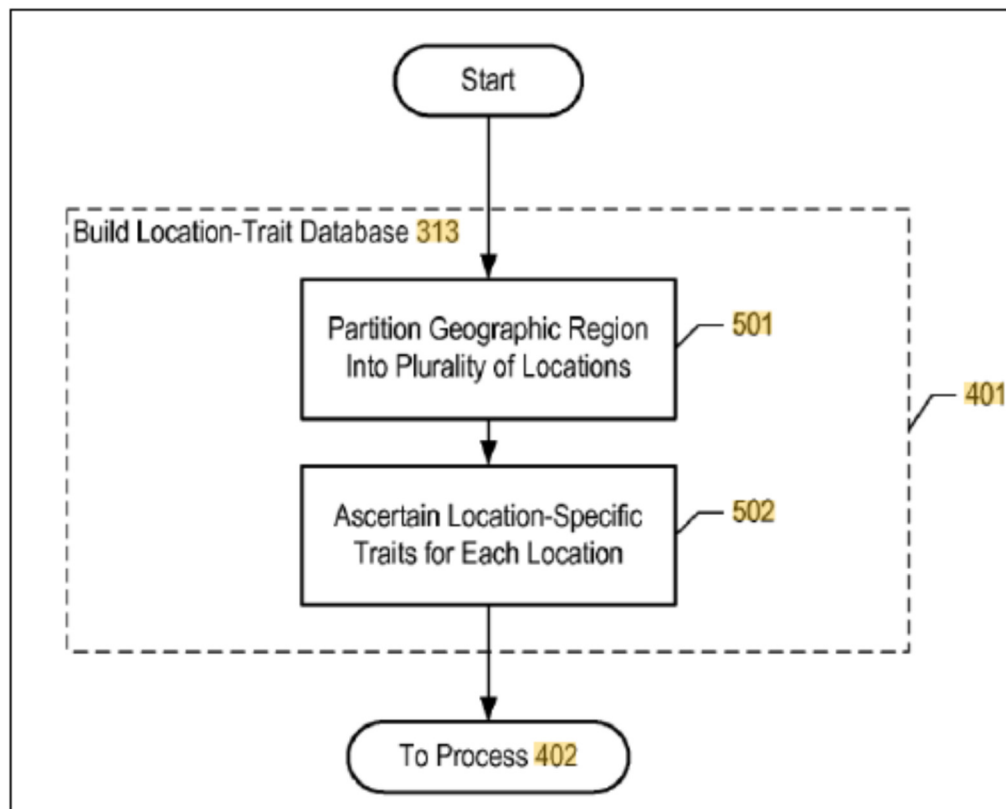
(region depicted in Spain Figs. 6A and 6B)



(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). EX1006 [Spain], [0098]-[0099]. Thus, Spain describes its partitioning 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. There is no analysis of calibration data being used to assign these identifiers. EX2022 [Sturza Decl.], ¶¶121-122. 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.” EX1006 [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). EX2022 [Sturza Decl.], ¶¶123-124. 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 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, Bhattacharya and Spain do not render obvious claims 3, 4 and 15 of the '494 Patent.

V. CONCLUSION

For the reasons set forth above, Petitioner has not met its burden of proving claims 2-5, 9, 11, 12, 14-16, 18-22, 27, 29, 31 and 32 of the '494 Patent are unpatentable by a preponderance of the evidence.

Date: August 23, 2024

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CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner's Response (the "POR") consists of 12,366 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 2022-2034

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