

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.

Petitioner,

v.

GEOSCOPE TECHNOLOGIES PTE. LTD,

Patent Owner.

Case IPR2024-00259
U.S. Patent No. 8,406,753

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

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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)
2002-2007	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)
2014-2015	Reserved
2016	U.S. Patent No. 7,561,104 ("104 Patent")
2017	U.S. Patent No. 9,097,784 ("784 Patent")
2018	Declaration of Mr. Mark Alan Sturza
2019	CV of Mr. Mark Alan Sturza
2020	Deposition Transcript of Dr. Karthikeyan Sundaresan for IPR2024-00259
2021	Reserved
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," available at 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 ; <i>last accessed</i> 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 , <i>last accessed</i> 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 ; <i>last accessed</i> 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 ; <i>last accessed</i> July 23, 2024 (“Techtarget”).
2033	<i>Excerpts from Telecom ABC, available at</i> https://www.telecomabc.com/i/is-41.html ; <i>last accessed</i> July 23, 2024 (“Telecom ABC”).
2034	Reserved
2035	Deposition Transcript of Dr. Karthikeyan Sundaresan for IPR2024-00031, IPR2024-00032, and IPR2024-00255

I. INTRODUCTION

U.S. Patent No. 8,406,753 (the “’753 Patent”) is directed towards a system and method for generating a location estimate using uniform and non-uniform grid points. EX1001 [’753 Patent], Title. Petitioner Apple Inc.’s (“Apple” or “Petitioner”) Petition challenges Claims 1, 7, 9, 32, 38, and 40 of U.S. Patent No. 8,406,753 (“’753 Patent”).

The independent claims in the ’753 Patent (claims 1 and 32), and thus all the dependent claims, require “[generating / generate] one or more sets of grid points for said calibration data.”¹ EX1001 [’753 Patent], cls. 1, 32 (emphasis added). The term “grid points”—which are often described with reference to “non-uniform grid points” or “NUGs” in the ’753 Patent—is not used generically in the patent. They are not just any points on a grid. Rather, as informed by the intrinsic record, the “grid points” are defined by and generated based on evaluation of previously-gathered calibration data.

This requirement is explicit in the Challenged Claims which require that the claimed grid points be generated “*for* said calibration data,” which has been collected for “each of one or more calibration points in a geographic region.” EX1001, cls. 1, 32. And this requirement is expressly described in the specification, which states that “calibration data for these locations [within a

geographic region] 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.” *Id.*, Abstract, 9:34-39 (emphasis added). Notably, the ’753 Patent further explains that “[t]he 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.” *Id.*, 12:9-14 (emphasis added). In other words, the claimed grid point does not and cannot exist until after calibration data is acquired and evaluated.

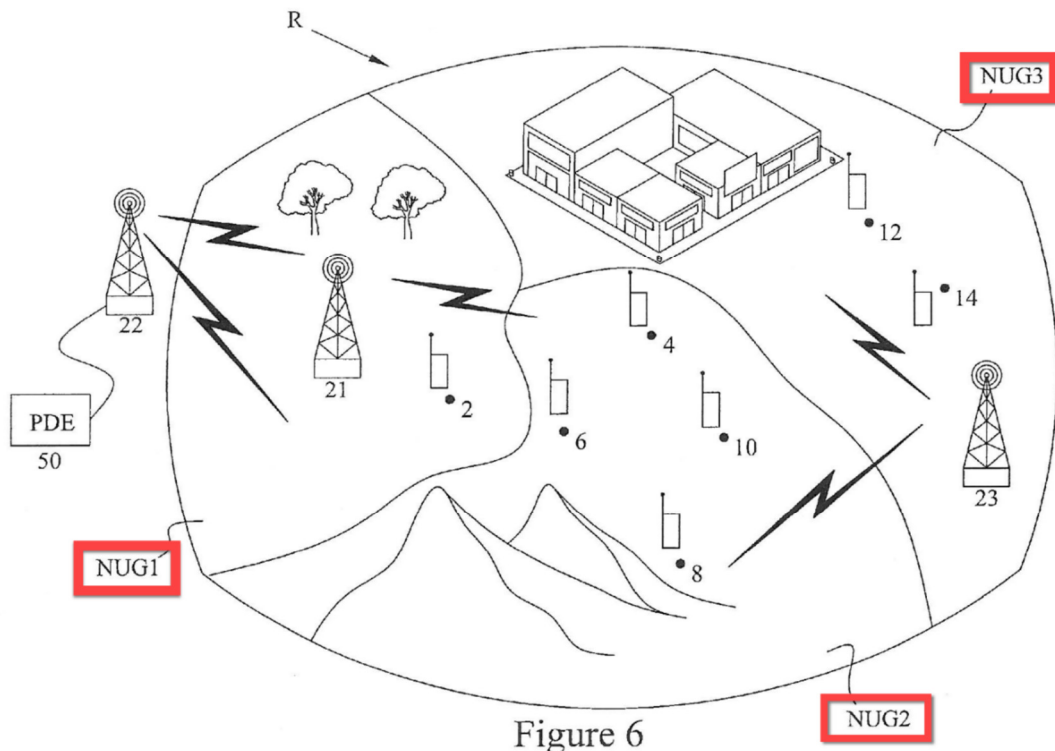
In the Related Litigation (*Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.*, Civ. Action No. 1:22-cv-01331 (EDVA)), the district court recognized this defining requirement and construed “grid point” as “a point associated with representative calibration data for an area.” EX2012 [Markman Order], 20. That the claimed grid points are associated with “representative calibration data for an area”—not just any calibration data—requires by its plain language that the calibration data be evaluated to determine what constitutes such representative data and the boundaries of the area represented by that data. This representative data—which is a subset of the calibration data gathered within the broader “geographic region” (*see* EX1001[’753 Patent], cls. 1, 32)—is then

associated with a “grid point” so that it represents the area within these determined boundaries.

The language of the claims also requires that grid points, including their geographical boundaries, are generated based on evaluation of calibration data. The relevant claim limitations recite “[generating/generate] one or more sets of grid points for said calibration data,” referring to the “calibration data for each of one or more calibration points in a geographic region” that is collected in the preceding step. EX1001 [’753 Patent], cls. 1, 32 (emphasis added). This claim language requires that the claimed grid points be generated based on this measured calibration data. And, as the intrinsic evidence shows, generating the claimed grid points includes defining the shape and boundaries of the area represented by those grid points. EX1001 [’753 Patent], 12:4-14 (“The geometric shape ... and the amount of data accumulated into such NUGs is ... determined by the statistical similarity of the data allocated to a NUG.”).

As a result, the claim scope is drawn to an unconventional approach to defining data structures for geolocation. For example, the figure reproduced below from the related ’784 patent depicts three “non-uniform grid points” or “NUGs”—which have been generated based on calibration data collected in a broader region

“R”—showing that they look nothing like any conventional conception of a “grid” or “grid points.”



EX2017 [’784 Patent], Fig. 6.

None of Petitioner’s art teaches “grid points” under the proper construction of the term, let alone the full limitation reciting “[generating/generate] one or more sets of grid points for said calibration data.” The asserted art only discloses conventional grids and points with predefined shapes that are generated based on system parameters such as resolution and computational burden. These are fundamentally different from the grid points claimed in the ’753 Patent, which are generated based on statistical similarity of the underlying calibration data. Thus,

Petitioner fails to meet its burden to prove that this claim as properly construed is unpatentable.

II. OVERVIEW OF THE '753 PATENT AND THE STATE OF THE ART

A. Background of the Technology

The '753 Patent relates to the geolocation of mobile devices using RF signals and cellular technologies. EX2018 [Sturza Decl], ¶49. 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], ¶49; 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], ¶49. The '753 Patent mentions several examples of such applications, including E911, "roadside assistance, turn-by-turn driving directions, concierge services, location-specific billing rates and location-specific advertising." EX1001 ['753 Patent], 1:28-45.

Location-based services for mobile devices generally rely on the mobile devices being able to determine their location through a process called "geolocation." EX1001, 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 device, as a computer, cell phone satellite, etc.”). 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], ¶50; 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], ¶51. One way a mobile device can be geolocated is by using a GPS receiver. EX2018 [Sturza Decl], ¶51; 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. EX2018 [Sturza Decl], ¶51; EX2024 [Leverage]. 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], ¶51.

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], ¶52. Many methods attempted to use RF signals to geolocate mobile devices, but generally had problems, including limited accuracy. *See* EX2026 [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* 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], ¶52.

Some systems, like the '753 Patent, attempted to use cellular signals to provide more accurate geolocation. The '753 Patent collects “calibration data” from the relevant geographic region and saving this information into a “calibration database” where it is associated with specific grid points. EX1001, 2:26-35, 2:51-

60. 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], ¶53.

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], ¶54. 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], ¶55. 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.

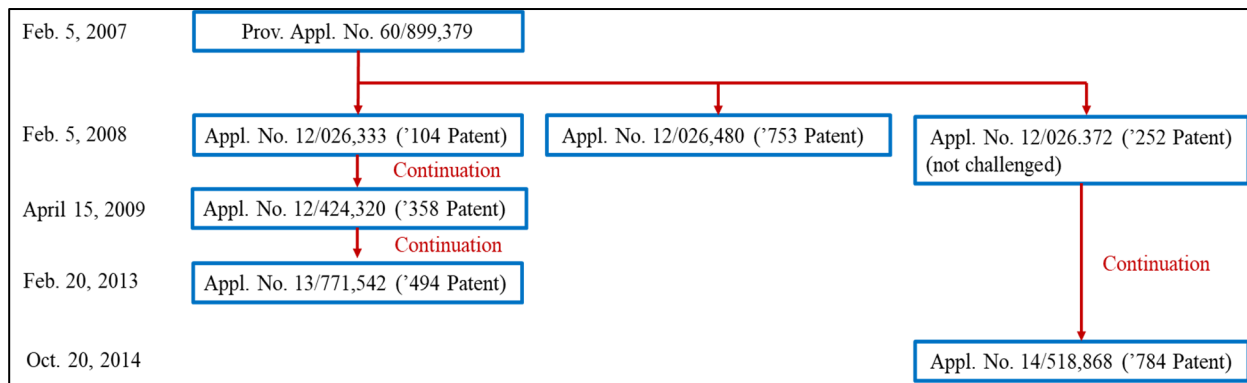
B. The '753 Patent

The '753 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, 1:15-23; EX2018 [Sturza Decl], ¶57. This involves collecting “calibration data,” which includes measuring the properties of such network signals at known locations referred to as “calibration points.” EX1001, 9:49-59. These properties may include, as one example, the measured strengths of the network signals, as received at those known locations, as well as other properties such as round trip time for signals or time difference of arrival of signals. EX1001, 9:60-10:8. After the calibration data is available, mobile devices at unknown locations can observe network signals and measure their properties (e.g., signal strength), and then compare this observed

data to the previously-gathered calibration data to determine their location.

EX1001, 9:43-48; EX2018 [Sturza Decl], ¶57.

The '753 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. Grid Points

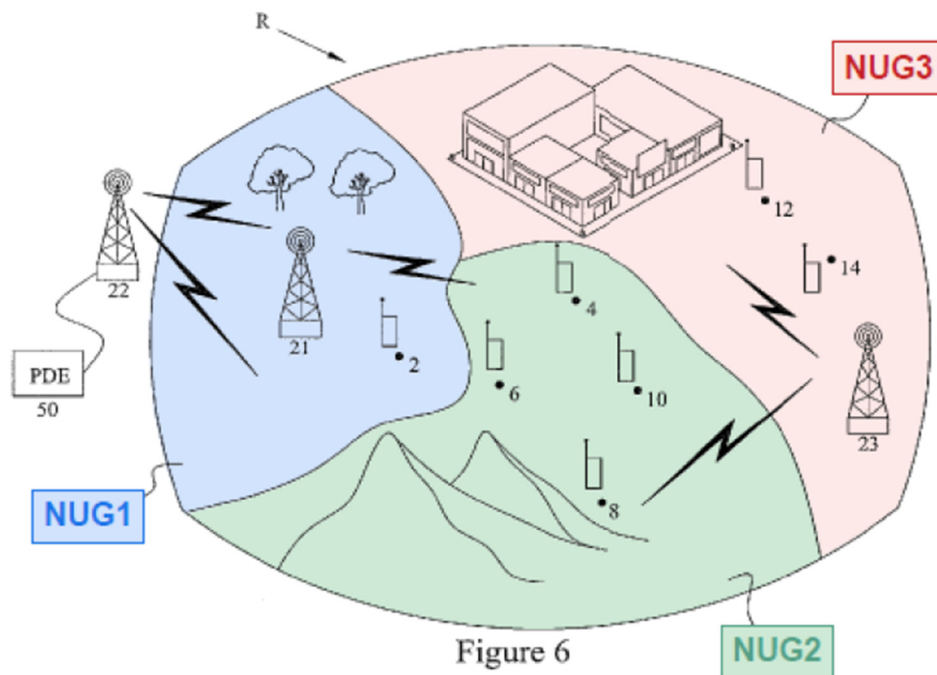
The invention of the '753 Patent involves the generation and use of what the patent refers to as “grid points” to improve the accuracy and efficiency of this process for using network signals for geolocation. EX1001, 2:21-50; EX2018 [Sturza Decl], ¶59. As explained below, the grid points of the '753 Patent are data structures that are generated from and associated with signal information based on analysis of the similarities between calibration data that has been previously collected in a region. The grid points serve as additional known locations

associated with network 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 ’753 Patent “usually will not be uniformly distributed throughout the geographic region,” and thus the ’753 Patent (and related patents) often uses the term “non-uniform grid points” or “NUGs” when describing grid points. EX1001, 2:43-50; *see also* EX2016 [’104 Patent], 3:50-60; EX2018 [Sturza Decl], ¶¶60.¹ The claimed grid points “represent an area of collected calibration

¹ U.S. Patent No. 7,561,104 (EX2016 [“’104 Patent”]; “’104 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 (EX2029 [’379 Provisional]; “’379 Provisional”) as the ’753 Patent, and describe “grid points” as the term is used in this patent family. The ’379 Provisional is incorporated by reference in the ’753 Patent (EX1001[’753 Patent], 1:8-11) and includes disclosures regarding “grid points” that are also found in the ’104 and ’784 Patents. See EX2029 [’379 Provisional], 5-7. Thus, in the Related Litigation, the district court relied on disclosures in the ’104 Patent and ’784 Patent in construing the term “grid point.” See EX2012 [Markman Order], 19-20 (citing ’104 Patent (as “Ex. B”) and ’784 Patent (as “Ex. F”)).

data” and “represent the signal characteristics and/or calibration data over a given region.” EX2016 [’104 Patent], 3:50-60; EX2018 [Sturza Decl], ¶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], ¶60.

As seen in the figure, each NUG—which has been generated based on the calibration data collected within “geographical region (R)” —corresponds to a

particular area within region R. EX2017 [’784 Patent], Fig. 6, 6:21-34; EX2018 [Sturza Decl], ¶61. 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], ¶61.

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], ¶62. This is because the boundaries of each grid point are defined by the calibration data itself. EX1001, 12:7-14; EX2029 [’379 provisional], 7²; EX2018 [Sturza Decl], ¶62 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], ¶62. Until that evaluation, the boundaries are undefined and the claimed grid point does not exist. EX2018

² References to EX2029 [’379 Provisional] refer to the pdf page (e.g., “Page 7 of 40”) rather than the internal pagination of the document.

[Sturza Decl], ¶62. 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. This is stated explicitly in the '753 Patent:

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.

EX1001, 12:7-14 (emphasis added); *see also* EX2029 ['379 Provisional], 7; EX1001, 1:8-11 (stating that the '379 Provisional is “incorporated by reference in its entirety” in the '753 Patent); EX2018 [Sturza Decl], ¶62.

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], ¶63. 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.

EX1001, Abstract, 2:31-35, 9:34-39 (emphasis added); EX2018 [Sturza Decl], ¶¶63.

Although the '753 Patent claims recite the generation of “grid points,” not only “non-uniform grid points” or “NUGs,” they make clear that the claimed grid points are generated “for said calibration data,” referring to the calibration data recited in the preceding limitation. EX1001, cls. 1, 32. Thus, regardless of whether the claimed grid points are ultimately uniform or non-uniform, they must be generated based on previously-gathered calibration data. EX1001, 2:31-35; EX2018 [Sturza Decl], ¶¶64. In practice, this will typically result in non-uniform grid points— accordingly, the '753 Patent explains that the claimed grid points “usually will not be uniformly distributed throughout the geographic region.” EX1001, 2:43-50; EX2018 [Sturza Decl], ¶¶64. While it is possible that the calibration data in a given region may be such that evaluation of the data results in generating grid points that are uniformly distributed throughout a region, this would be unusual. EX1001, 2:43-50; EX2018 [Sturza Decl], ¶¶64. Even in this unlikely event, however, the grid points (including the boundaries of the area they represent) are still determined from evaluation of the calibration data. EX2018 [Sturza Decl], ¶¶64. Put simply, even if evaluation of the calibration data ultimately

results in uniform grid points, the boundaries of those uniform grid points—which define their shape and size (e.g., whether the uniform grid points each cover an area on the order of meters or kilometers)—are still determined from evaluation of the calibration data. EX2018 [Sturza Decl], ¶64.

The '753 Patent also refers to a “predetermined fixed uniform grid” but the generated grid points are not necessarily part of this grid—indeed, this grid is a distinct concept from the generated grid points. EX1001, cl. 4, 13:13-20, 15:57-67, 18:13-26; EX2018 [Sturza Decl], ¶65. In other words, even if this “uniform grid” is used, the generated grid points may be non-uniformly distributed. EX2018 [Sturza Decl], ¶65. The specification explains that a “uniform grid” may be defined over a region to assign locations and data that form the “root” of a first generated grid point. EX1001, 10:29-43; EX2018 [Sturza Decl], ¶65. The subsequent grid points, however, are generated by evaluating this assigned data and may have different roots that are not part of this uniform grid. EX1001, 10:44-65; EX2018 [Sturza Decl], ¶65. Thus, a single generated grid point may be anchored to a point on this uniform grid while the other generated grid points are not, and are non-uniformly distributed. EX2018 [Sturza Decl], ¶65. The distinction between the “uniform grid” and the generated grid points of the '753 Patent is further exemplified by Figure 17 and its accompanying disclosure:

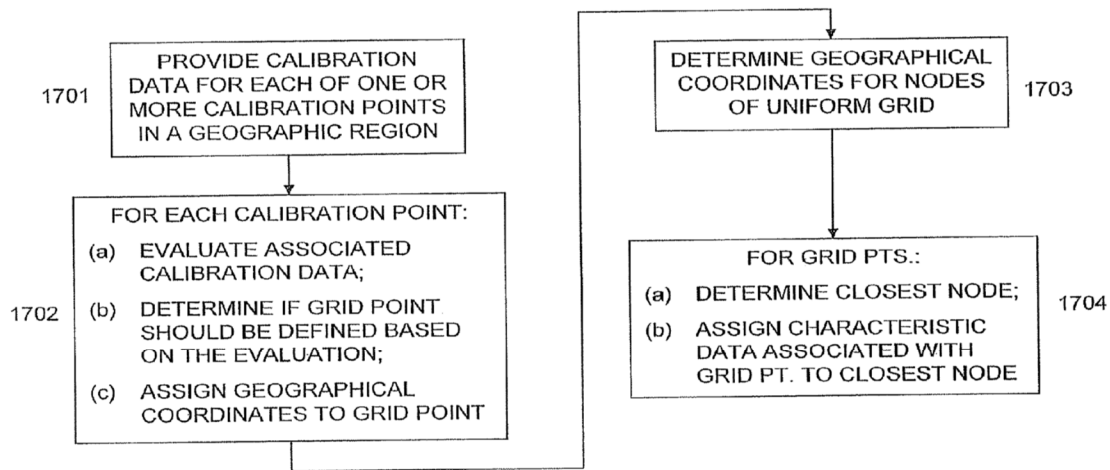


FIGURE 17

EX1001, Fig. 17, 15:57-67; EX2018 [Sturza Decl], ¶¶65. As seen in block 1702, grid points are generated based on evaluating the calibration data associated with calibration points where the data has been collected (block 1701). EX1001, Fig. 17, 15:57-67; EX2018 [Sturza Decl], ¶¶65. Then, as a distinct step, there is a determination of “nodes of [the] uniform grid.” EX1001, Fig. 17, 15:57-67; EX2018 [Sturza Decl], ¶¶65. Thus, the ’753 Patent distinguishes between the generated grid points and the nodes of the uniform grid. EX1001, Fig. 17, 15:57-67; EX2018 [Sturza Decl], ¶¶65. Although some of the generated grid points may overlap these nodes under certain circumstances, they are still distinct elements.

The evaluation of calibration data that is part of generating a grid point 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. EX1001, 10:44-59; EX2029 [’379 Provisional], 6-7; EX2018 [Sturza Decl], ¶66. 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. EX1001, 10:66-11:6; EX2029 [’379 Provisional], 6-7; EX2018 [Sturza Decl], ¶66. 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. EX1001, 10:66-11:6, 12:4-14; EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl], ¶66.

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], ¶67. 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. EX1001, 10:46-47; EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl], ¶67. 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. EX1001, 10:55-59; EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl], ¶¶67. If, however, these clusters of data are determined to be “sufficiently different,” then they are allocated to different grid points. EX1001, 10:50-55; EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl], ¶¶67. 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. EX1001, 12:9-14; EX2029 [’379 Provisional], 7; EX2018 [Sturza Decl], ¶¶67.

C. Challenged Claims

The Petition challenges claims 1, 7, 9, 32, 38, and 40 of the ’753 Patent. Petitioner relies on a single obviousness ground (Bhattacharya in view of Yost.) Pet., 1.³

³ The Petition §V.A is titled “The Challenged Claims are obvious over Bhattacharya”. Pet., 9. However, this appears to be a typo because the section that follows analyzes Bhattacharya combined with Yost.

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], ¶68; EX2035 [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.” EX1004 [Bhattacharya], Abstract. This estimation is performed by location system 212. EX1005 [Bhattacharya], [0059], [0064], [0065], Figs. 2-18; EX2035 [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. Yost

Yost describes a “method for locating concentration of mobile radio (MR) traffic in a coverage area [] by identifying where MRs [] in the coverage area [] are actively making calls.” EX1008, Abstract. This determination of “where the MR traffic is concentrated” can be used to “make system design decisions related to traffic handling” such as where to establish “a micro cell to increase capacity” in a

given area. *Id.*, 2:17-27. The method described in Yost involves “3 separate phases: a calibration phase, a capture phase, and a data analysis phase.” *Id.*, 6:37-39.

In the calibration phase, “test devices [] are placed within the coverage area of interest and a set of ‘calibration’ data points or signal strength measurements at each test site [] are taken.” *Id.*, 6:65-7:2. In the capture phase, “signal strength measurements for the MRs [] whose geographical distribution is desired” is collected. *Id.*, 8:3-5. In the data analysis phase, the data collected as part of the prior phases “may be analyzed to determine the positions of the MRs whose data was captured.” *Id.*, 8:39-41.

E. Level of Ordinary Skill

The Petition states that “A person of ordinary skill in the art relating to the subject matter of the ’753 Patent as of February 5, 2007 (“POSITA”) would have had at least a Bachelor’s degree in electrical engineering, computer science, or a similar discipline, and at least two years of experience in the field working with working with navigation and/or geolocation systems. EX1003, ¶[8]. Superior education could compensate for a deficiency in work experience” Pet., 6-7.

The level of ordinary skill in the Petition is incorrect. EX2018 [Sturza Decl.], ¶¶44-47. The '753 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.], ¶45. The definition proposed by Petitioner in the related IPR2024-01212 involving the '753 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 18. EX2018 [Sturza Decl.], ¶45. 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*. EX2018 [Sturza Decl.], ¶45.

III. CLAIM CONSTRUCTION

The Petition applies the district court’s constructions for the terms “calibration points,” the order of “providing ...,” “generating ...,” “evaluating ...,” and “selecting ...” steps, “calibration data,” “network measurement report,” “grid point,” “evaluating said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing parameters,” and “evaluate said at least one network measurement report with each of said sets of grid points as a function of select ones of said characterizing parameters.” Pet., 7-8; EX2020 [Sundaresan Dep. Tr.], 8:18-21 (“Q [] you are applying the district court's constructions in your analysis in this IPR, right? A Correct.”); 9:11-13 (“Q Do you agree with the district court’s constructions of these terms? A I do.”). The Board, for purposes of the Institution Decision, adopted “the district court’s claim constructions and those agreed-upon by the parties in the litigations.” 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 ’753 Patent specification specifically incorporates the ’379 Provisional by reference. EX1001, 1:8-11; *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” as “a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data” to address the dispute between the parties. PO does not believe any other terms need construed at this point in the proceedings but reserves the right to do so if raised by Petitioner.

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., 8; EX2012 [Markman Order], 6-8. The ’753 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 [’753 Patent], 2:21-3:21. The ’753 Patent teaches providing “Network Measurement Reports (‘NMRs’) which include calibration data for a number of locations withing a geographic region.” *Id.*, 2:26-31. “Calibration data” includes network measurement data such as “signal strength, round trip time, time difference of arrival (TDOA), etc.” EX2016 [’104 Patent], 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.” EX2016 [’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], ¶74.

B. “Grid Point”

PO proposes the following constructions for “grid point”:

Term	Proposed Construction
“Grid Point”	“a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data.”

As discussed below, PO’s construction for “grid point” is correct because it is required by the intrinsic record, but supported by the Markman Order. PO’s

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

1. The Intrinsic Record Requires Evaluation of Calibration Data to Determine the Boundaries of the Area Represented by a “Grid Point”

Consistent with the district court's construction, the intrinsic record requires that “grid points,” including the boundaries of the area they represent, be generated based on evaluation of calibration data. EX2018 [Sturza Decl], ¶80. The independent claims of the '753 Patent require “[providing/receiving] calibration data for each of one or more calibration points in a geographic region” and “generat[ing] one or more sets of grid points for said calibration data.” EX1001, cls. 1 and 32. That is, the claims require the grid points are generated for calibration data. Thus, the claims require generating grid points—including the boundaries of the areas they represent—based on an evaluation of calibration data. EX2018 [Sturza Decl], ¶80.

The specification of the '753 Patent also requires PO's construction for “grid point.” EX2018 [Sturza Decl], ¶81. For example, the specification states that “calibration data for these locations must be gathered and analyzed so that particular points (e.g., ‘grid points’) within the geographic region can be determined and associated with a particular set or sets of calibration data from, for

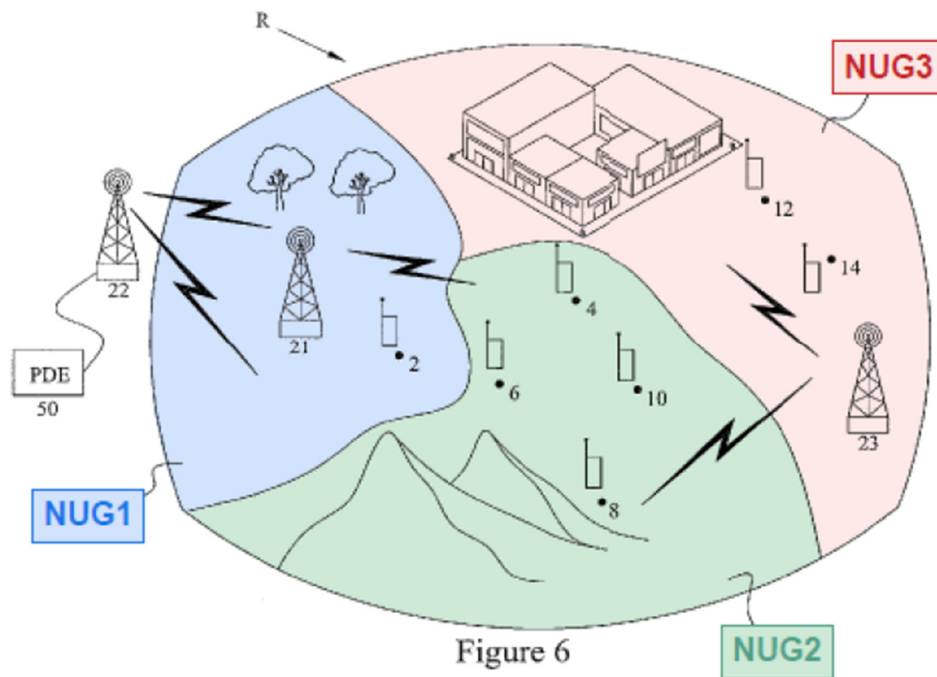
example, one or more NMRs.” EX1001, 2:31-35, Abstract, 9:34-39; EX2018 [Sturza Decl], ¶¶81. Thus, the specification likewise teaches that grid points must be determined based on an analysis of calibration data. EX2018 [Sturza Decl], ¶¶81.

Similarly, the ’753 Patent explains that the boundaries of the area represented by a 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:

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.

EX1001, 12:7-14 (emphasis added); *see also* EX2029 [’379 Provisional], 7; EX2018 [Sturza Decl], ¶¶82.

NUGs that have been generated based on calibration data collected in a broader region “R” 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 (“a geographical region (R) having NUGs represented by NUG1, NUG2, and NUG3”); EX2018 [Sturza Decl], ¶83.

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], ¶84; *see also supra* § II.B.1 (further describing the claimed grid points of the ’753 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. EX1001, 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.”), Abstract, 9:34-39; EX2018 [Sturza Decl], ¶84. As the ’379 Provisional—which is incorporated by reference in the ’753 Patent (EX1001, 1:8-11)—states that “*the root of the NUG is the calibration data vector*” and that the evaluation of the calibration data vector is “*of great importance since it is fundamental to the method*” of generating grid points. EX2029 [’379 Provisional], 6 (emphasis added); EX2018 [Sturza Decl], ¶84.

As explained above, the claimed grid points must be generated based on an evaluation of the measured calibration data, including to determine the boundaries of the area they represent, regardless of whether that ultimately results in grid points that are uniform or non-uniform. Supra § II.B.1; EX1001 [’753 Patent], 2:31-35; EX2018 [Sturza Decl], ¶85.

The ’753 Patent describes the evaluation of calibration data that occurs to generate a grid point. 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. EX1001, 10:44-11:6, 12:4-14; EX2029 [’379 Provisional], 6-7; EX2018 [Sturza Decl], ¶86. Multiple methods of evaluating statistical similarities across the calibration data

may be used to allocate calibration data to different grid points. EX1001, 10:66-11:6 (referring to “clustering tests” and “K-means algorithm”); EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl], ¶86. For example, calibration data is evaluated to determine whether it “exhibit[s] clustering.” EX1001, 10:46-47; EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl], ¶86. 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. EX1001, 10:50-59; EX2029 [’379 Provisional], 6; EX2018 [Sturza Decl], ¶86.

The result of this evaluation and allocation of data to each 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. EX1001, 12:7-14; EX2029 [’379 Provisional], 7; EX2018 [Sturza Decl], ¶87. Additionally, the allocation of subsets of calibration data collected at various locations (i.e., different “calibration points”) within a region to different grid points defines the areas represented by each grid point. EX1001, 10:39-11:6, 12:4-14; EX2018 [Sturza Decl], ¶87. Consequently, the “geometrical shape” (i.e., boundaries) of the area represented by a particular 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. EX1001, 12:4-14; EX2029 [’379 Provisional], 7; EX2018 [Sturza Decl], ¶87.

2. The Markman Order supports PO’s construction.

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 ’753 Patent and related patents that use the same term.

The district court adopted the phrase “representative calibration data for an area” in its construction of “grid point” to “reflect that the defining characteristic of a NUG region—as explained in the specifications of the ’753 Patent, ’104 Patent, and [’784] Patent—is that the data points within an area are all ‘statistically very similar’ such that each of the grid points within the NUG region can represent the overall NUG.” EX2012 [Markman Order], 20 (emphasis added) (citing EX2016 [’104 Patent], 3:56-60; EX1001, 10:29-11:7; EX2017 [’784 Patent], 6:22-28).

Thus, the district court explained that the phrase “representative calibration data for an area” in its construction means that the calibration data associated with a grid point are “statistically very similar” such that the calibration data are representative of the area encompassed by the grid point. EX2018 [Sturza Decl], ¶89. This is also how the ’753 Patent describes the claimed grid points. EX1001,

10:55-11:6 (explaining how grid points are generated based on evaluation of whether clusters of calibration data are “statistically very similar” and identifying tests used to determine such “[s]tatistical similarity”); EX2018 [Sturza Decl], ¶¶89. Because this is a “defining characteristic,” the claimed grid points cannot exist until after the calibration data is gathered and analyzed.

Under the district court’s construction, a “grid point” is not associated with generic calibration data. EX2018 [Sturza Decl], ¶¶90. Rather, a “grid point” must be associated with calibration data that is representative across a specific area. EX2018 [Sturza Decl], ¶¶90. This requires that the boundaries of the area represented by a given grid point be determined by evaluating the calibration data so the subset of data associated with that grid point is representative of that area. EX2018 [Sturza Decl], ¶¶90. The ’753 Patent describes 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. EX1001, 10:39-65 (“If the aggregated cluster . . . is statistically very similar to either of the first or second clusters . . . then the data for the two calibration points may be allocated to the same NUG”), 12:4-14 (“The NUGs may fully cover the region R and each NUG has statistically similar data accumulated into itself”), 10:66-11:6; EX2029 [’379

Provisional], 6-7; EX2018 [Sturza Decl], ¶¶90. Thus, what may constitute representative calibration data for a grid point covering a particular area is a subset of the calibration data that is collected through a broader region. EX2018 [Sturza Decl], ¶¶90; *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)).

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., 27. 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”).

Indeed, how the claimed grid points are generated is fundamental to what a grid point is—they must be generated based on evaluation of the calibration data so that they are representative of a particular area. EX1001 [‘753 Patent], cl. 1 (“generating one or more sets of grid data for said calibration data”); EX2018

[Sturza Decl], ¶¶91. 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], ¶¶91. The intrinsic evidence confirms that how the claimed grid points are generated is an essential characteristic of what they are. *See supra* § III.B.1. 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], ¶¶92. Similarly, the ’753 Patent describes in detail how grid points are generated so that they can serve their purpose of representing a given area. EX1001, 10:39-11:6, 12:4-14; EX2018 [Sturza Decl], ¶¶92.

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], ¶¶93. 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], ¶¶93. 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.

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. *Supra*, § III.B.2. And, as explained above, the intrinsic evidence confirms that this is a requirement of the claim term “grid point.” *Supra*, § III.B.1.

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

A. Bhattacharya And Yost Do Not Teach “Grid Points” Under The Proper Construction

The challenged claims of the ’753 Patent require “generating one or more sets of grid points for said calibration data,” or for the system claims, a processor programmed to “generate one or more sets of grid points for said calibration data.” EX1001, cls. 1, 7, 9, 32, 38, 40. Under the proper construction of “grid point” in Section III.B, there is no disclosure in Bhattacharya or Yost that teaches or renders obvious this limitation.

As explained above in Section III.B.2, the district court concluded that “grid point,” as used in the ’753 Patent, specifically refers to “a point associated with representative calibration data for an area” that is generated based on analysis of calibration data. EX2012 [Markman Order], 20; EX2018 [Sturza Decl], ¶96; *see also* EX2012 [Markman Order], 19 (district court explaining that gathering and analyzing calibration data is “what *must be done* to arrive at a grid point or set of grid points” (emphasis in original)). The district court recognized that the ’753 Patent explains that “grid points do not necessarily have to be part of a uniform grid and usually will not be uniformly distributed throughout the geographic region,” and that such non-uniformly distributed grid points are more specifically referred to as “non-uniform grid points” or “NUGs.” EX1001, 2:43-50.

As confirmed by the district court’s Markman order, the claimed grid points are generated for “representative calibration data.” This necessarily requires the grid points to be generated based on an analysis of the calibration data. *See supra* § III.B. Petitioner offers no explanation for how the representative calibration data could be generated and then associated with the grid point without analysis of the calibration data. Determining which calibration data is representative logically requires such analysis. EX2018 [Sturza Decl], ¶97. Thus, the district court’s requirement that the claimed grid points be associated with “representative

calibration data” necessarily encompasses the requirement to generate the grid points based on analysis of the calibration data. The district court further confirmed this with its explanation that “representative calibration data” in its construction “reflect[s] 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.” EX2012 [Markman Order], 20 (*citing* EX2016 [’104 Patent], 3:56-60; EX1001 [’753 Patent], 10:29-11:6; EX2017 [’784 Patent], 6:22-28). In other words, the district court emphasized that “representative calibration data” in its adopted construction encompasses analyzing the calibration data to assess similarities and determine what data is representative so that it can be associated with a grid point. Accordingly, although the district court’s adopted construction (which Petitioner has proposed here) does not expressly use the words “analyzing calibration data,” such analysis is necessarily required by its construction.

Moreover, the claim language in the ’753 Patent also requires an analysis of calibration data. Claim 1 recites “generating one or more sets of grid points for said calibration data”—that is, the grid points are generated “*for* said calibration data”—i.e., the calibration data collected in the preceding step. EX1001, cl. 1. *See, e.g., id.*, cl. 32. This further confirms that claimed grid points are generated based

on analysis of the collected calibration data, consistent with the district court's construction of the term. EX2018 [Sturza Decl], ¶98.

Likewise, the specification supports this interpretation. EX1001, 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], ¶99.

Petitioner relies primarily on Bhattacharya as teaching this limitation but it describes a fundamentally different approach than what is claimed in the '753 Patent. EX2018 [Sturza Decl], ¶100. Petitioner points to Bhattacharya's disclosure of a step of populating an “Expected Signal-Strength Database” where “a rectangular grid of X by Y tessellated squares is overlaid onto geographic region 200” as satisfying this limitation. Pet., 35-38, 51-52. But the complete claim limitation requires generating grid points “*for* said calibration data,” and thus, requires more than determining a location or point independent of any calibration data. And, as explained above, this requirement expressly recited in the claim limitation is consistent with the district court's construction of “grid point” which

inherently requires determining the grid points from analysis of the collected calibration data.

Bhattacharya, on the other hand, only discloses overlaying onto a region a predefined grid of squares that is independent of any calibration data, and using the center of each square as a location to populate the Expected Signal-Strength Database. Thus, Bhattacharya's grid of squares is not generated "for said calibration data." Instead, it is generated for geographic region 200. EX2018 [Sturza Decl], ¶101. This fails to teach or render obvious the "[generating/generate] one or more sets of grid points for said calibration data" limitation of the challenged claims.

In particular, Bhattacharya describes the partitioning of a geographic region that Petitioner relies on as teaching this limitation as simply overlaying "a rectangular grid of X by Y tessellated squares ... onto geographic region 200." EX1004 [Bhattacharya], [0106]. An exemplary overlaid grid of Bhattacharya is shown in Figure 6, reproduced below.



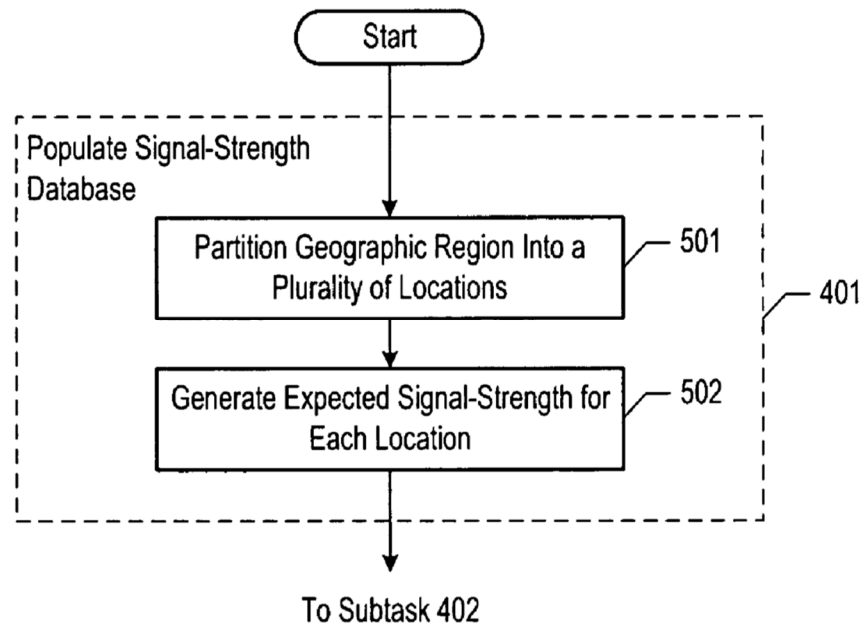
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terms of complexity and accuracy. By disclosing an overlaid grid defined by considerations of resolution, computational burden and error tolerance, Bhattacharya teaches away from defining a grid based on the collected calibration data, as required by the '753 Patent claims. EX2018 [Sturza Decl], ¶¶102-103.

Similarly, Bhattacharya emphasizes the predefined nature of the overlaid grid, focusing on the “number and size of squares” or “another tessellated shape (e.g., triangles, rectangles, hexagons, etc.)” without any reference to that overlaying being based on calibration data with similar values. *Id.*, [0111]; EX2012 [Markman Order], 20 (“the defining characteristic of a NUG region—as explained in the specifications of the '753 Patent, '104 Patent, and '748 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.”). Thus, even when addressing alternative embodiments of its grid, Bhattacharya makes clear that the grid—regardless of the number, size, and shape used—is still independent of any calibration data. EX2018 [Sturza Decl], ¶104.

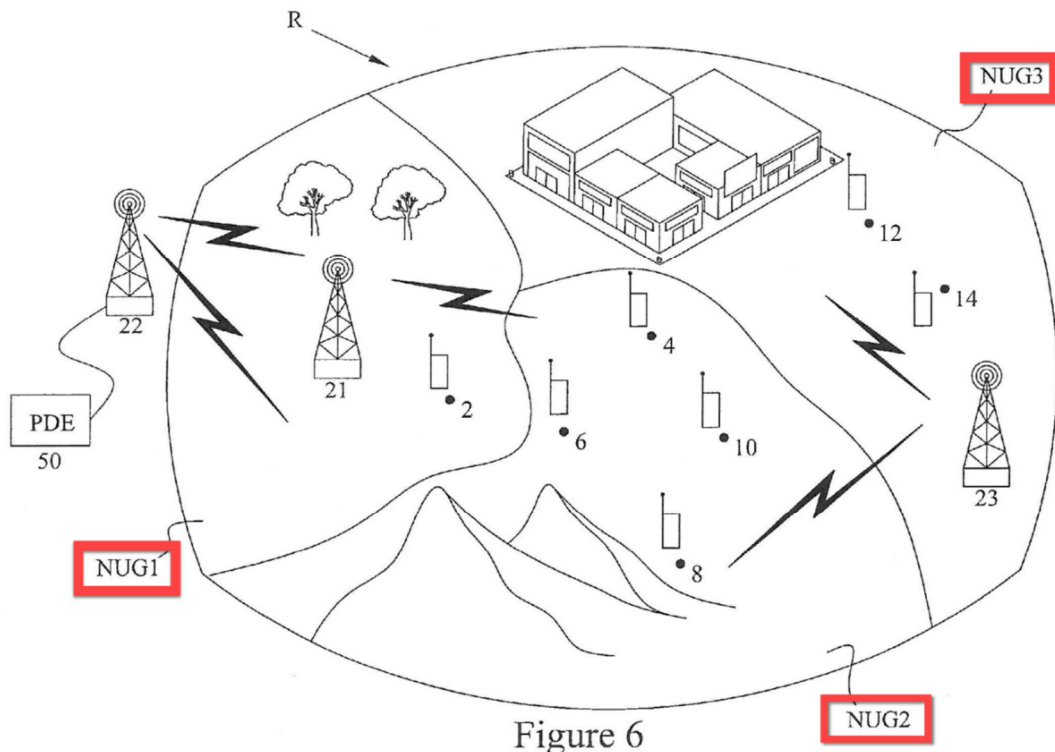
Figure 5 of Bhattacharya further reinforces the difference between the predefined grid of Bhattacharya and the “grid” of the '753 Patent that is determined from analysis of the calibration data. Figure 5, reproduced below,

“depicts a flowchart of the salient subtasks” involved in populating the “Expected Signal-Strength Database.” *Id.*, [0031], [0085], Fig. 5.



As seen in the figure, the partitioning of a geographic region via overlaying a grid onto the region occurs before the expected signal-strength for each location is generated. *See id.*, [0106] (explaining that subtask 501, referred to in Figure 5 as partitioning a geographic region into a plurality of locations, involves overlaying “a rectangular grid of X by Y tessellated squares” onto a geographic region). Thus, Bhattacharya teaches that the expected signal strengths are generated only after the predefined grid is created and overlaid onto a geographic region. This confirms that the overlaid grid of Bhattacharya is not based on an analysis of calibration data. EX2018 [Sturza Decl], ¶¶105-106.

Petitioner relies on Bhattacharya's teaching of "expected signal-strength functions" being generated from "the empirical measurements described by Bhattacharya." Pet., 35 (citing EX1004 [Bhattacharya], [0115]-[0117]). This is distinct, however, from generating the grid points from analysis of the calibration data. As seen in the related '784 Patent which depicts grid points, the location and boundaries of the grid points themselves are determined from the calibration data, typically leading to a non-uniform distribution of the grid points:



EX2017 ['784 Patent], Fig. 6; EX2018 [Sturza Decl], ¶107. *see supra* § III.B.1.

In Bhattacharya, however, the location and boundaries of the squares in the grid are defined independently of any calibration data. In fact, as explained above,

the location and boundaries of the squares in the grid are based on considerations regarding the operation of the system that are indisputably not calibration data. Because of this Bhattacharya's grid is predefined and fixed based on such considerations whereas the "grid" of the '753 Patent depends on analysis of similarities in the collected calibration data. EX2018 [Sturza Decl], ¶108. The substantial difference between these two approaches—and the resultant "grids"—is clear from Figure 6 of Bhattacharya and Figure 6 of the '784 Patent (which is related to the '753 Patent and depicts the claimed grid points), both shown above.

Id.

Petitioner's reliance on Yost does not remedy the deficiencies in Bhattacharya. Petitioner only points to Yost's discussion of using "testing devices[s]" to collect empirical measurements at various locations and alleges that a POSITA would have known from Yost to "average the multiple empirical measurements." Pet., 37-38. None of this changes that the overlaid grid in Bhattacharya is entirely predefined based on considerations of the desired accuracy and complexity of the system rather than calibration data. Thus, even if Petitioner's contentions about what a POSITA would have understood from Yost are credited, they do not address this shortcoming in Bhattacharya. And Petitioner identifies nothing in Yost that independently teaches or renders obvious the

“[generating/generate] one or more sets of grid points for said calibration data”

limitation of the challenged claims. EX2018 [Sturza Decl], ¶109.

Moreover, Petitioner fails to show how the combination of Bhattacharya and Yost satisfies the district court’s construction of “grid point” requiring it to be associated with “representative calibration data for an area.” Indeed, Petitioner does not even attempt to address the “representative calibration data” part of the “grid point” construction. For example, Petitioner does not explain how Bhattacharya or Yost teaches anything about “representative calibration data,” what it means for calibration data to be “representative,” how to evaluate whether calibration data is “representative,” or anything else that could plausibly satisfy this part of the construction. EX2018 [Sturza Decl], ¶110. *See generally* Pet., 35-38.

Notably, the district court—which adopted the construction that Petitioner proposed here—explained that “representative calibration data” in the construction reflects 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.” EX2012 [Markman Order], 20. Yet, Petitioner does not point to anything in Bhattacharya or Yost teaching evaluating the statistical similarity, or any other commonality, in the

calibration data. EX2018 [Sturza Decl], ¶111. Petitioner disregards the “representative calibration data” portion of the construction, which is a fatal flaw in its argument. Accordingly, Petitioner fails to show that the combination of Bhattacharya and Yost renders obvious the claims of the ’753 Patent.

B. 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, Dr. Sundaresan does not actually provide his opinion, let alone facts and data supporting his opinion, on the level of ordinary skill. 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.

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. Dr. Sundaresan adopts the claim constructions from the district court’s Markman Order as his own. EX1003 [Sundaresan Decl.], ¶28; EX2020 [Sundaresan Dep. Tr.], 8:18-21 (“Q [] you are applying the district court’s constructions in your analysis in this IPR, right? A Correct.”); 9:11-13 (“Q Do you agree with the district court’s constructions of these terms? A 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.], ¶¶25-28. *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.” EX2035 [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 deposition testimony. Dr. Sundaresan was repeatedly unable to opine on whether the district court’s analysis was correct:

- EX2035 [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 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 '753 Patent incorporates Provisional Application No. 60/899,379 by reference. EX1001 ['104 Patent], 1:8-11; *see supra*, §II.B. Petitioner did not submit the '379

Provisional as an exhibit in this IPR⁴ 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.” EX2035 [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 review 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.” EX2035 [Sundaresan Dep. Tr.], 60:24-61:1. Similarly, Dr. Sundaresan testified he did not consider the related '784 and '104 Patents in preparing his declaration. EX2035 [Sundaresan Dep. Tr.], 65:1-15.

⁴ 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 '753 Patent and expressly incorporated by reference in its entirety into the intrinsic record. EX1001 ['753 Patent], (60), 1:8-11. The file history—in its entirety—always forms part of the intrinsic record and as such, is highly relevant. *Phillips* at 1317. The '104 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 '104 Patent (as “Ex. B”) 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 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 its 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.

V. CONCLUSION

For the reasons set forth above, Petitioner has not met its burden of proving claims 1, 7, 9, 32, 38, and 40 of the '753 Patent are unpatentable by a preponderance of the evidence.

Date: August 23, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner's Response (the "POR") consists of 10,630 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

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