

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner

v.

GEOSCOPE TECHNOLOGIES PTE. LTD.
Patent Owner

Case No. IPR2023-01211
Patent 8,786,494

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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I. INTRODUCTION

Petitioner submits this Reply to Patent Owner's Response (Paper 26, "POR").

The Challenged Claims of the '494 Patent are unpatentable because they recite well-known prior art techniques for locating mobile stations. Patent Owner acknowledges much of the '494 Patent to be unpatentable by express disclaimer of all but one challenged claim, thereby admitting the Patent's weakness. EX2024.

Patent Owner's arguments hinge on a new claim construction limiting the terms "grid point" or "non-uniform grid point" to require features from exemplary embodiments. Dependent claims 4 and 26 (the only Challenged Claims) recite an element of conceded independent claims 1 and 25, namely "previously-gathered calibration data", and should have been disclaimed with claims 1 and 25. Patent Owner's attempt to preserve claims 4 and 26 is to argue that the "previously-gathered calibration data" is for a "non-uniform grid point" that must be ascribed a special meaning that is narrower than the '494 Patent specification and prosecution history would permit. This has already been recognized by the Board and by the District Court in a parallel proceeding.

The Board adopted the District Court's final construction of the term "grid point":

Final Construction
“a point associated with representative calibration data for an area”

The Board correctly found this construction to be sound. ID, pp.11 (n.6), 28-29.

Patent Owner’s own expert conceded on cross-examination that the prior art satisfies claims 4 and 26 under the noted final construction. EX1032, 62:5-21 (conceding that patentability depends on Patent Owner’s new construction). Patent Owner’s reliance on a new claim construction lacks any proper legal support in the file history. Patent Owner’s failure to raise any deficiency of the prior art under the final construction constitutes waiver. Paper 15, p.9 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”).

Patent Owner’s newly concocted claim construction (requiring “evaluation” and “statistically very similar” data) renders the terms “grid point” and “non-uniform grid point” indefinite because it focuses more on *what must be done* to arrive at a grid point rather than its *properties*. The District Court rejected any such construction. EX1028, p.19. The Board also rejected “Patent Owner’s ... attempts to introduce additional requirements that are not part of the claim construction”. ID, p.33. Thus, the legal construction of the term “grid point” by the Board is sound, and all Challenged Claims are unpatentable.

The prior art clearly discloses a database comprising “previously-gathered calibration data for one or more non-uniform grid points within said region” under both constructions. Substantial evidence presented by Petitioner supports a finding that all Challenged Claims are unpatentable.

II. CLAIMS AT ISSUE AND STATEMENT OF THE PRECISE RELIEF REQUESTED

The Board instituted review of claims 1, 4, 25, 26, and 35 of the ’494 Patent in this IPR. ID, p.41. Patent Owner in response statutorily disclaimed claims 1, 25, and 35. EX2024. Judgment that claims 1, 25, and 35 are unpatentable is in order.

Petitioner requests the Board to find remaining claims 4 and 26 unpatentable based on the substantial evidence discussed herein.

III. CLAIM CONSTRUCTION

A. Patent Owner’s Additional Requirements For the Construction of “Grid Point” Were Previously Rejected

Patent Owner’s entire case rests on its assertion that the District Court’s construction of “grid point” is wrong because this term requires features from exemplary embodiments regarding “*evaluation*” of calibration data to determine the boundaries of the area represented by a ‘grid point’’. POR, p.18 (emphasis added). *See also id.*, p.2. The District Court and the Board have already rejected Patent Owner’s attempts to introduce additional requirements into “grid point”.

In Related Litigation, Patent Owner asserted that “grid point” requires that calibration data be “*analyzed*”. EX1028, p.19. The District Court rejected this

attempt to limit a “grid point” based on “what *must be done* to arrive at a grid point or set of grid points”. *Id.* The POPR again asserted that grid points “are generated based on the *analysis* of calibration data”. POPR, p.2 (emphasis added). Again, the Board rejected “Patent Owner’s ... attempts to introduce additional requirements that are not part of the claim construction”. ID, p.33.

Patent Owner now swaps its “analysis” construction in favor of an “evaluation” construction without explanation or legal justification. Patent Owner makes no attempt to explain why the swapped term necessitates a different outcome.

B. “Grid Point” Was Properly Construed To Exclude “Evaluation” of Calibration Data

Patent Owner argues that a “grid point” and “non-uniform grid point” (NUG)¹ are required to be “generated based on evaluation of calibration data.” POR, p.3. The file history of the ’494 Patent does not limit the term “grid point” or “non-uniform grid point” to require any specific “evaluation” as this is an example of *what can be done* to arrive at a “grid point” or NUG.

Evaluation is Not Required

¹ A “NUG” is defined as a non-uniform grid point in the ’494 Patent and the related ’753 Patent. EX1001, 3:59; EX1008, 2:46, 9:40-43.

An “evaluation” of calibration data is an example of *what can be done to arrive at a grid point* rather than *properties* of the grid point. Patent Owner’s expert Mr. Sturza acknowledged that the District Court’s final claim construction of “grid point” makes no mention of any “evaluation”:

7 Q. And on page 20 of the district court Claim
8 Construction there's a box that says Final
 Construction.

9 A. Yes.

10 Q. Correct?

11 A. Correct.

12 Q. And that's the final construction of "grid
13 point." Correct?

14 A. That's correct.

15 Q. Okay. My question to you is, in this
16 discussion on page -- starting on page 18 as it
 relates

17 to the construction of grid point that goes all
 the way

18 to page 20, is there any discussion of evaluation
 or

19 evaluating? Please let me know where that is
 mentioned

20 in the district court's Claim Construction.

21 ATTORNEY McBRIDE: Objection. Relevance.

22 A. Yeah, I -- I don't recall seeing that in
 those
23 pages. I don't recall if the district court
 construed
24 "evaluating" or "evaluation," but I don't recall
 it
25 being in that section.

Note that Patent Owner's counsel in the above line of questioning even objected to the "relevance" of "evaluation" to the construction of the term "grid point".

Patent Owner asserts that the required "evaluation ... involves determining which data are 'statistically very similar'" (POR, p.10), but this is clearly not legally supported by the file history. The '494 Patent and the related '753 Patent disclose that calibration data is representative for an area (*see* EX1001, 3:65-4:2, 4:49-61; EX1008, 10:29-59, 12:15-25, 12:58-67) and can be a single calibration point which constitutes a grid point or a NUG with no further evaluation ("If the NUG contains only a single calibration point, the location of the NUG may be set as the location of the calibration point." EX1008, 12:59-61, *see also id.*, 10:64-65).

The '753 Patent expressly discloses many ways for generating a grid point associated with representative calibration data for an area (*see* EX1008, 10:29-59, 12:15-25, 12:58-67), including measurement of a single signal strength. Patent Owner's expert acknowledged that representative calibration data of a grid point can

simply be a “signal strength” at that point (i.e., a grid point’s properties can be one or more signal strengths as representative calibration data stored for that point):

9 Can the signal strength be the data that
10 constitutes the representative calibration data?
11 A. Well, that was, you know, as we saw, an
12 example in one point in the '104 patent.

EX1031, 56:9-12. One or more signal strengths measured at a point, without further evaluation, can thus serve as representative calibration data for a grid point. Petitioner’s expert Mr. Williams testified that measured signal strength may serve as representative calibration data. *See* EX1012, ¶¶24, 37.

The ’494 Patent confirms grid points can also be determined from collected calibration data without evaluation. *See* EX1001, 3:61-4:2. The Board’s construction is properly focused on “what a grid point *is*” and not *what can be done* to arrive at a grid point. ID, p.28 (quoting EX1028, p.19). *See* EX2023, 37:10-22 (“[Determining a grid point] would not require analysis. It could be just the actual measurements ... [s]o analysis could be part of it, but it doesn’t have to be.”).

The terms “evaluation”, “statistically very similar” data, and “boundaries of an area” correspond to exemplary methods to generate grid points in the ’753 Patent and related applications, and are not requirements. The ’379 Provisional Application of the ’494 Patent expressly discloses generating grid points and NUGs that are not based on statistical consistency/similarity of data. EX1005, p.8 (“Additionally, we also consider the method of generating NUGs based not on statistical consistency

but on other conditions”). Patent Owner provides no basis for limiting a non-uniform grid point to any specific exemplary evaluation that requires statistical similarity/consistency and boundaries of an area. Patent Owner fails to demonstrate any clear and unmistakable disclaimer/disavowal. *Avid Tech., Inc. v. Harmonic, Inc.*, 812 F.3d 1040 (Fed. Cir. 2016).

Regarding “statistical similarity”, Patent Owner relies on a disclosure from the ’753 Patent with respect to non-uniform grid points (NUGs) and states that “[t]he geometrical shape ... and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG.” POR, p.25 (citing EX1008, 12:7-14). However, the very next paragraph of the ’753 Patent confirms that “statistical similarity” of data is merely one embodiment, i.e., “[one] may also consider *the method of generating NUGs based not on statistical consistency of calibration data, but on other conditions*”. EX1008, 12:15-17 (emphasis added). *See also* EX1005, p.8.

Patent Owner incorrectly asserts that Figure 6 of the related ’784 Patent confirms that the claimed non-uniform grid points “look nothing like any conventional conception of a ‘grid’ or ‘grid points’”. POR, p.3. The ’784 Patent expressly states that Figure 6 illustrates “an *exemplary* non-uniform grid (NUG) region”, and Patent Owner’s expert agrees. EX1007, 3:12-13, EX1031, 115:13-20. Patent Owner’s expert Mr. Sturza was also unable to confirm whether boundaries

are even stored pursuant to the teachings of the '753 Patent. EX1031, 57:1-14 (“that’s getting into embodiments, which is something I haven’t opined on.”).

There is no legal basis to import the limitations (e.g., “evaluation”) Patent Owner seeks to import. The Federal Circuit has rejected similar attempts to import limitations. *See, e.g., Malvern Panalytical Inc. v. TA Instruments-Waters LLC*, 85 F.4th 1365, 1372 (Fed. Cir. 2023); *Hill-Rom Services, Inc. v. Stryker Corp.*, 755 F.3d 1367, 1375 (Fed. Cir. 2014).

Grid Point was Properly Construed to Encompass a Single Calibration Point

During Related Litigation, Patent Owner’s proposed construction for “grid point” included multiple calibration points by requiring “locations or areas that are determined and associated with a particular set or sets of calibration data.” EX1028, p.19. The District Court rejected this construction, acknowledging that “representative calibration data” encompasses not only a set or sets of calibration data, but also a **single** calibration point. EX1028, p.20.

Patent Owner now repackages this argument in asserting that the District Court’s *Markman* Order expanded the term “grid point” to require 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.” POR, p.19. Patent Owner is wrong; the District Court’s Order merely referenced an

example of “representative calibration data” and confirmed calibration data can be a **single** calibration point. EX1028, p.20. The Federal Circuit has “cautioned against interpreting a claim term in a way that excludes disclosed embodiments, when that term has multiple ordinary meanings consistent with the intrinsic record.” *Nobel Biocare Servs. AG v. Intradent U.S., Inc.*, 903 F.3d 1365, 1381 (Fed. Cir. 2018) (quoting *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1383 (Fed. Cir. 2008)). See also *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1305 (Fed. Cir. 2007) (“We normally do not interpret claim terms in a way that excludes disclosed examples in the specification.”).

The ’753 Patent confirms that “representative calibration data” can include a **single** calibration point or a set or sets of calibration data. EX1008, 10:64-65. Patent Owner and its expert cite the ’753 Patent at 10:44-59 and 10:66-11:6 (POR, p.10; EX2020, ¶69) yet ignore this language at 10:60-65. Patent Owner’s expert Mr. Sturza confirmed that he could not and has not provided any opinion on the amount of calibration data that may form a NUG. EX1031, 52:13-53:5; 52:20-22; 101:1-4 (“I haven’t, you know, thought about that. I haven’t, you know, provided an opinion on how big or small the set of calibration data could be.”).

To the extent a NUG having a single calibration point as “representative calibration data” requires any “statistical similarity,” the individual calibration point itself would make up a “statistically similar” group of one. EX1008, 12:59-61.

The '753 Patent confirms that a NUG can have “representative calibration data” that is “only a single calibration point.” *Ibid.*; *see also id.*, 10:64-65. The Board’s construction of a “grid point” at institution remains legally sound.

C. “Non-Uniform Grid Point” Was Properly Construed by the Board and Does Not Require a New Construction

At institution, the Board construed “non-uniform grid points” as “grid points that are non-uniformly spaced throughout a geographic region.” ID, p.30.

Patent Owner now asserts that the term “non-uniform grid point” should be expressly construed, having not done so in the Related Litigation. POR, p.3. Patent Owner asserts that, to the extent the Board finds that a “grid point” is not required to be generated “based on evaluation of calibration data”, the Board should adopt a construction of “non-uniform grid point” that expressly recites this requirement. *Id.* Patent Owner’s construction of “non-uniform grid points” should fail for the same reasons discussed above with respect to “grid point”.

Patent Owner’s argument that “[t]he specification also requires Patent Owner’s proposed construction of ‘non-uniform grid point’” is misplaced. POR, p.24. Patent Owner merely cites to portions of the specification of the '494 Patent that comport with the current construction of “grid point” and do not mention anything about “evaluation” or “analysis.” *See id.* *See also* EX1001, 3:59-65. The '494 Specification confirms that non-uniform grid points do not require evaluation of calibration data, but may include calibration data that is simply

collected in an area. EX1001, 3:65-4:2 (“The NUGs represent an area of collected calibration data”). The ’494 Specification is consistent with the current construction of “non-uniform grid point” as it 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, 3:59-66 (emphasis added). *See also* EX2023, 39:7-11 (Mr. Williams testified that “calibration data does not require analysis”).

D. Patent Owner’s New Construction Renders a “Grid Point” and a “Non-Uniform Grid Point” Ambiguous and Indefinite

Patent Owner’s new construction injects ambiguity, as evidenced by Mr. Sturza’s admissions that he does not know the metes and bounds of the newly proposed “evaluation” requirements. Indeed, Mr. Sturza asserts that “[t]he terms ‘non-uniform grid point’ and ‘NUG’ are not to my knowledge terms of art with commonly understood meanings” (EX2020, ¶73), yet provides no cogent explanation of the meaning of the referenced “evaluation”, “statistical very similar” data, and “boundaries” terms required by Patent Owner’s construction.²

² Mr. Sturza admits that “the ’753 Patent uses the term ‘non-uniform grid points’ or ‘NUGs’ when describing grid points. EX2020, ¶63. *See also* EX1032, 14:23-15:1

First, Patent Owner fails to explain the metes and bounds of “evaluation” and “statistical similarity”. Mr. Sturza concedes that he provided no explanation as to how the “evaluation” could be performed. EX1031, 83:19-21. *See also id.*, 87:5-6 (“I’ve provided, you know, no opinion on how the evaluation could be performed.”), 87:9-15 (“Q. So you do not have any opinion on how the evaluation in your construction might be performed. Is that correct? ... A. That’s correct.”). Mr. Sturza also concedes that “statistical similarity ***“is not a defined value”***”. EX1031, 81:6-10. *See also id.*, 75:2-5, 84:4-6 (“Well, you know, I haven’t, you know, provided an opinion on statistically similar”). Mr. Sturza concedes that he did not provide any explanation of the degree of “similarity” that is required and the “statistic” considered when determining whether data is “statistically” similar. EX1031, 81:6-10, 82:13-21 (“A. Again, not something I specifically opined upon.”). The metes and bounds of “evaluation” and “statistically similar” required by Patent Owner’s construction remain undefined and ambiguous by Mr. Sturza’s own admission. *See Atlas IP, LLC v. Medtronic, Inc.*, 809 F.3d 599 (Fed. Cir. 2015) (rejecting a District Court’s construction because it was “ambiguous”).

(stating that the ’753 Patent “conflate[s]” non-uniform grid points with grid points and “[t]here’s not, you know, a clear distinction”).

Patent Owner’s failure to articulate metes and bounds of “evaluation” and “statistical similarity” is not surprising given that the ’494 and ’753 Patents do not elaborate on this concept, but merely call out “statistical similarity”, (EX1008, 11:1) “statistical sufficiency” (*id.*, 10:46), and “statistical consistency” as exemplary embodiments (*id.*, 12:16), without further explanation.

Second, Patent Owner’s claim construction imports ambiguous functional limitations of “evaluating” calibration data into the structural claim term of “grid point.” “When a claim limitation employs functional language, the examiner’s determination of whether the limitation is sufficiently definite will be highly dependent on context (e.g., the disclosure in the specification and the knowledge of a person of ordinary skill in the art).” MPEP §2173.05(g) (citing *Halliburton Energy Servs. v. M-I LLC*, 514 F.3d 1244, 1255 (Fed. Cir. 2008)). In *Halliburton*, a claim including the term “fragile gel” was found to be indefinite because the proposed construction of the term did not “resolve[] the ambiguity in the scope” of the functional term. *Halliburton*, 514 F.3d at 1250. The “fragile gel” was defined in the specification “by *what it does rather than what it is*” and it was found to be ambiguous. *Id.* at 1255-56 (emphasis added). Patent Owner’s construction of “grid point” based on ambiguous functional limitations must therefore fail.

IV. CLAIMS 4 AND 26 ARE UNPATENTABLE

First, Patent Owner admits claims 4 and 26 are unpatentable under the District Court’s claim construction. EX1032, 62:5-21 (admitting patentability depends on Patent Owner’s construction). Patent Owner fails to argue how the prior art fails to disclose a “grid point” and “non-uniform grid point” under the District Court’s construction.

Second, “grid point” and “non-uniform grid point” are satisfied even under Patent Owner’s erroneous construction.

Third, the phrase “*for* one or more non-uniform grid points within said region” in claims 4 and 26 (i.e., the only recitation beyond disclaimed claims 1 and 25) is an intended use of the previously-gathered calibration data. Patent Owner conceded the unpatentability of “a database of previously-gathered calibration data” by disclaiming claims 1 and 25 (EX2024), and an intended use cannot impart patentability of claims 4 and 26.

A. Ground 1: Claims 4 and 26 are Anticipated by Shkedi

Claims 4 and 26 are anticipated by Shkedi under either claim construction because it discloses that a mobile telephone measures and stores a plurality of service antenna signals (i.e., signal strengths) such that the mobile telephone can be located “within a predetermined proximity of the original user selected location.” Pet., pp.25-26 (citing EX1006, 8:41–48). These signal strengths are calibration data

“representative” of the area formed by the “predetermined proximity,” making up non-uniform grid points in Shkedi’s database. Pet., p.29 (citing EX1012, ¶¶108-110). Locations (*e.g.*, calibration points, calibration data) “within a predetermined proximity of the original user selected location” are points associated with representative calibration data for an area (*id.*), and are non-uniformly spaced, user-selected points (*i.e.*, not predefined). *Id.* The Board agreed that Shkedi discloses grid points non-uniformly spaced throughout a geographic region. ID, p.34.

The “evaluation” in Patent Owner’s new construction encompasses “other functions of the calibration data” (POR, p.10; EX2020, ¶69; EX1005, p.6), and Shkedi discloses an extrapolation function. EX1006, 13:15-23. Mr. Sturza admitted that the “other functions of the calibration data” encompass mathematical functions such as extrapolation (EX1031, 80:8-12 (“it’s some manipulation of input data to provide output data”)). “Shkedi builds the database as a ‘transformational data bank’ of non-uniform grid points ‘by collecting correspondences between GPS (latitude longitude) coordinates’ and the signal strengths for the user selected locations,” and “[a] ‘never registered location’ is found by ‘extrapolating’ to find locations failing ‘to report GPS.’” Pet., p.29 (citing EX1006, 13:15–23). Such extrapolated locations constitute non-uniform grid points generated based on “evaluation” (*e.g.*, extrapolation) of collected calibration data. EX1006, 17:44, 13:9-25; EX1012 ¶111. *See also* Pet., p.30 (citing EX1006, 17:43–45, 10:37–63, 14:1–7; EX1012 ¶114).

Shkedi also discloses “boundaries of the area represented by the grid point are determined from evaluation of the calibration data”. For example, “the locations within buildings” where calibration data is collected must be analyzed and/or evaluated so buildings “where ‘GPS signals’ are unavailable” can be determined. Pet., p.30 (citing EX1006, 17:43-45). The calibration data within the buildings are evaluated to determine whether GPS signals are available or unavailable for calibration points collected within the buildings.

Patent Owner argues that Shkedi does not disclose that its “‘user selected location[s]’ stored in a database represent an area”. POR, p.32. However, Shkedi’s “user selected location[s]” are stored in the database such that the mobile telephone can be located “within a predetermined proximity of the original user selected location.” Pet., p.29 (citing EX1006, 8:41–48). A “predetermined proximity” around user selected locations denotes calibration data representative of that proximal area. User selected locations are random locations in which a user travels (i.e., not “predefined”). *See, e.g.*, EX1006, 17:29-30 (“[A]s a cell phone user moves around”). *See also* ID, pp.28-29 (“Shkedi does not teach or suggest that any such locations are specifically chosen by the user or otherwise pre-defined.... [W]e are persuaded that one of ordinary skill in the art would have recognized these locations to be random locations...”). Patent Owner’s expert recognized the distinction between gathering data along “planned” routes, and gathering data using “crowdsourcing” from

“wherever people or devices happen to be”. EX1031, 64:13-66:17. As with non-uniform grid points of the ’494 Patent, Shkedi allows a user to “conclude that it is within a predetermined proximity” of a grid point if the measured signal strength falls within the area represented by the calibration data. EX1006, 8:47.

Patent Owner argues that Petitioner “conflates ‘calibration points’ and ‘grid points’ in the ’494 Patent claims.” POR, p.35. Patent Owner is wrong. Shkedi discloses generating new points (e.g., by extrapolation) as one or more non-uniform grid points: “[a] ‘never registered location’ is found by ‘extrapolating’ to find locations failing ‘to report GPS.’” Pet., p.29 (citing EX1006, 13:15–23; *see also* 17:44, 13:9-25; EX1012, ¶128).

Patent Owner asserts that Shkedi’s “never registered locations” means that the locations are never stored in the database at any point in time. POR, p.38. Patent Owner is wrong. Shkedi’s “never registered location[s]” refer to locations that were not previously registered. EX1006, 13:15-23. The Petition (p.29) explains that once non-uniform grid points are generated via extrapolation, they are registered and stored in the database for Shkedi’s signal-comparison based location determining method.

B. Ground 2: Claims 4 and 26 are Rendered Obvious Over Shkedi in View of Spain

Shkedi in view of Spain satisfies the District Court’s and Patent Owner’s constructions.

Patent Owner does not contend that Spain fails to disclose or suggest “one or more non-uniform grid points” under the District Court’s construction. Patent Owner’s only argument under the District Court’s construction is that Petitioner “does not provide any substantive analysis for its asserted combination of Shkedi in view of Spain”. POR, p.42. Patent Owner is wrong.

Petitioner explained why it would have been obvious to combine Spain with Shkedi. Pet., p.32 (citing EX1012, ¶¶126-129). *See also* EX1006, 5:4-23. Spain and Shkedi address the same problem of inaccurate mobile location determination due to degraded GPS signals. Pet., p.32. Shkedi recognizes a need for “the construction of ‘fingerprint’ topological database maps”, which Spain provides. EX1006, 9:37-38. Shkedi teaches that “one does not want to dedicate lots of portable device resources to the monitoring activity, so one may divide the monitoring into low accuracy monitoring activities—which just tell the device if there might be anything to seriously compare ... and higher accuracy monitoring activity—which takes the necessary resources to make the necessary determining definitive.” EX1006, 11:63-12:5. Spain provides examples of some lower/higher accuracy methods referenced by Shkedi. *See* Pet., p.32, EX1009, ¶¶[0089]-[0094]. A POSITA would have recognized Spain’s methods as directly applicable to Shkedi’s database of registered signal strengths.

Spain’s “learning/training fingerprint techniques” are applicable to Shkedi’s fingerprint database to generate more non-uniform grid points in Shkedi’s database: “locations failing to be able to report GPS could be known from extrapolation [or interpolation] using only the reception signature” (e.g., by registering and recording the non-uniform grid points generated from the learning/training techniques with Shkedi’s reception signature as input). Pet., p.32; EX1006, 13:23-25.

Shkedi teaches to “record signal strengths at a desired location at different times of day at different days of the week since cell phone traffic at cells is known to have a repetitive pattern.” EX1006, 20:19-22. A POSITA would have applied Spain’s learning/training technique to Shkedi’s existing fingerprints recorded “at a desired location at different times of day” to “produce specific databases for different times of the day, different weather conditions, or different seasons ... so that the database can be continually improved.” EX1009, ¶[0055]. Spain’s generating non-uniform grid points would have furthered Shkedi’s goal of “storing at least one measurement []thereby upgrading robustness of the electronically stored measurements” to “improv[e] the electronically stored ... signal strength measurements”. EX1006, 12:59-67.

Patent Owner asserts that Spain teaches that “interpolated fingerprints are used to fill in missing fingerprint measurements at predetermined locations—*i.e.*, locations that are defined in advance independently of any calibration data.” POR,

p.40. Patent Owner’s construction does not foreclose generating “grid points” at “predetermined locations”. Moreover, Spain expressly distinguishes interpolated points from the “predetermined locations”. *See* EX1009, ¶[0101].

Patent Owner “has defined ‘non-uniform grid points’ to encompass ‘interpolated’ grid points.” Pet, p.40 (citing EX1008, 23:1-15, EX1016, ¶61 (“grid points help[] fill in the map”), EX1012, ¶¶171-172). Mr. Sturza admits that “evaluation” can include simple mathematical functions (EX2020, ¶69 (citing EX1005, 6)); EX1031, 80:8-12), such as interpolation.

Patent Owner fails to appreciate that Spain’s interpolated points can be generated to resolve arbitrary (i.e., not predetermined), potentially ambiguous locations in a fingerprint database that are only identified and resolved by evaluation of calibration data. Spain discloses “eliminating potentially ambiguous positions from consideration”. EX1009, ¶[0009].

Fingerprint ambiguities exist, for example, when a measured fingerprint (i.e., calibration data, such as signal strength) from a mobile device matches “the fingerprint model for the incorrect location.” *Id.*, ¶[0103]. Spain discloses that “(4) the system can learn which are the ambiguous areas within an intelligent agent, and collect measurements for them, so the [fingerprint] database can be continually improved.” *Id.*, ¶[0055]. Spain also discloses that “...when a fingerprint model is

produced for a particular region, it can be subjected to statistical analysis to ... identify specific areas that can have potential ambiguity problems.” *Id.*, ¶[0104].

Spain discloses generating new fingerprints to resolve such ambiguities. *Id.*, ¶[0055]. One technique Spain discloses for generating a new grid point (i.e., fingerprint) is by interpolation of existing fingerprints, as discussed *infra*. *Id.*, ¶[0101]. Spain’s interpolated grid points increase database accuracy by resolving potential ambiguities in calibration data and are associated with representative calibration data for the area from which they were generated. Spain discloses generating geographically “small areas” (i.e., boundaries) as grid points. *Id.*, ¶[0099]. “In one instance, the fingerprint corresponds not to one exact spot on the surface of the earth, but instead to a small area.” *Id.*).

C. Ground 3: Claims 4 and 26 are Anticipated by Zhu

Zhu satisfies the District Court’s and Patent Owner’s constructions.

Patent Owner fails to present any argument concerning Zhu under the District Court’s construction. Patent Owner asserts that Zhu does not teach or suggest “one or more non-uniform grid points” because Zhu’s “‘measured points’ are locations where calibration data is *collected*”. POR, p.44. Patent Owner asserts that Petitioner “conflates two distinct claim terms”. POR, p.45. The ’753 Patent makes clear that a single calibration point can be allocated to a single non-uniform grid point. EX1008, 12:59-61 (“If the NUG contains only a single calibration point, the location of the

NUG may be set as the location of the calibration point.”). *See also id.*, 10:64-65. Patent Owner’s expert concedes that “[e]ach calibration point may become the root of a separate NUG”. EX1031, 101:1-4. In Zhu, each calibration point becomes the root of a separate non-uniform grid point and “a point associated with representative calibration data for an area”—just like the ’494 Patent.

Patent Owner asserts that “Petitioner’s argument is based on erroneous characterizations of Patent Owner’s complaint”. POR, p.45. Patent Owner is wrong. Zhu’s “interpolated points” and “modeled points” constitute “non-uniform grid points” at least because Zhu determines the interpolated points and modeled points by analyzing/evaluating collected calibration data. Pet., p.40 (citing EX1010, pp.93-94, Fig. 2; EX1012, ¶¶168-170).

Patent Owner admits that the “evaluation” in Patent Owner’s construction encompasses “other functions of the calibration data” (POR, p.10; EX2020, ¶69; EX1005, p.6), and Zhu discloses functions of “interpolation” and “modeling”. Mr. Sturza admits that the “other functions” encompass even simple mathematical functions (EX1031, 80:8-12), such as the “interpolation” and “modeling” of Zhu.

Zhu’s “interpolated” and “modeled” points are obtained from evaluation of calibration data to determine the boundaries of the area represented by the grid points (i.e., the collective gray areas in Figure 2 corresponding to the “interpolated points” and “modeled points”):

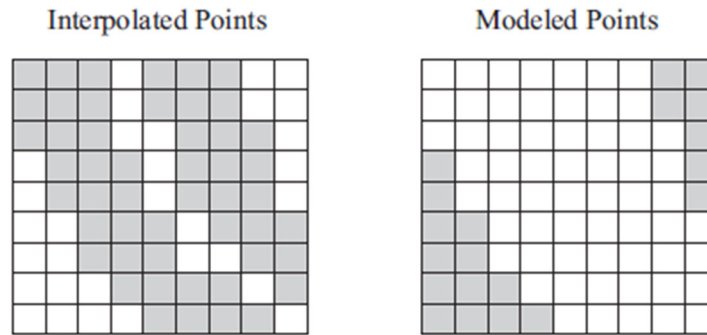


Figure 2 of Zhu (Excerpt)

See also Pet., pp.40-41. Patent Owner asserts that the prior art does not disclose grid points having “different shapes or sizes”, and notes Zhu’s uniform square grid spacings. POR, pp.41-42, 13-14. *See also* EX2020, ¶57 (“non-uniform grid points (NUGs) of varying shapes and sizes”). Yet, Patent Owner’s construction does not require the areas/boundaries to have varying shapes/sizes. Mr. Sturza did not foreclose the possibility of uniform boundaries. EX1031, 72:4-25 (“Q. Is it possible that the evaluation that you speak of would result in boundaries that are uniform? ... A. Well, I think that’s a -- unlikely but, you know, perhaps possible.”).

D. Ground 4: Claims 4 and 26 are Rendered Obvious Over Zhu in View of Spain

It would have been obvious to combine Zhu and Spain (Pet., pp.50-51) by modifying Zhu’s system “to include Spain’s learning/interpolating technique for improving location accuracy with non-uniform grid points ‘between grid points’ (EX1009, [0055]:6-9), e.g., for ‘all locations in between the sampled locations’

(EX1009, [0101]:1-4).” Pet, p.51. Zhu’s measured points would have been used in Spain’s system to generate a new grid for Zhu’s database. EX1009, ¶[0055].

Zhu applies its own method to generate “interpolated points” using “many imaginable schemes for local interpolation.” EX1010, p.93, right col. *See also id.*, p.94, Fig. 2. One “scheme” is Spain’s scheme of using “Support Vector Machines for Regression or Regularized Regression ... to learn each mapping of position versus fingerprint (measured or predicted signal strengths).” EX1009, ¶[0054]. Using Spain’s techniques would have increased the non-uniform grid points in Zhu’s RF Map Database to produce “more accurate location information.” EX1010, p.96, right col.

E. Ground 6: Claim 26 is Rendered Obvious Over Shkedi in View of Zhu and Spain

Patent Owner asserts that “none of Shkedi, Zhu, or Spain teaches or discloses ‘non-uniform grid points.’” POR, 48. Patent Owner is wrong. As explained above, each of Shkedi, Zhu, and Spain teaches and discloses non-uniform grid points under both the District Court’s and Patent Owner’s constructions. *See* Sections IV.A-D, *supra*. Without explanation, Patent Owner asserts “Petitioner provides no explanation as to how Shkedi would be modified in view of Zhu and Spain to achieve the claimed invention.” POR, 48. The Petition explains how Shkedi would have been modified in view of Zhu and Spain. Pet., pp.28-32, 40-41, 47, 49-51, 57.

V. CONCLUSION

Substantial evidence supports finding Claims 4 and 26 of the '494 Patent are unpatentable.

Date: September 11, 2024

Respectfully submitted,

/Patrick C. Keane/

Patrick C. Keane, Esq. (Reg. No. 32,858)

BUCHANAN INGERSOLL & ROONEY PC

1737 King Street, Suite 500

Alexandria, Virginia 22314

Direct Telephone (703) 838-6522

Main Facsimile (703) 836-2021

patrick.keane@bipc.com

Counsel for Petitioner

APPENDIX A – LIST OF EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 8,786,494, issued on July 22, 2014 (“the ’494 Patent”)
1005	U.S. Provisional Application No. 60/899,379, filed on February 5, 2007 (“the ’379 Provisional”)
1006	U.S. Patent No. 7,706,811, issued on April 27, 2010 (“Shkedi”)
1007	U.S. Patent No. 9,097,784, issued on August 4, 2015 (“the ’784 Patent”)
1008	U.S. Patent No. 8,406,753, issued on March 26, 2013 (“the ’753 Patent”)
1009	U.S. Patent Application Publication No. 2003/0064735, published on April 3, 2003 (“Spain”)
1010	Jian Zhu and G. D. Durgin, “Indoor/outdoor location of cellular handsets based on received signal strength,” 2005 IEEE 61st Vehicular Technology Conference, Stockholm, Sweden, 2005, pp.92-96, Vol. 1, doi: 10.1109/VETECS.2005.1543256 (“Zhu”)
1012	Declaration of David Hilliard Williams
1016	Complaint dated November 22, 2022, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022 (“the Related Litigation”)
1028	Claim Construction Memorandum Opinion & Order dated July 19, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1031	Deposition Transcript of Mark Sturza in IPR2023-01209, -01210, -01211 (August 27, 2024)

1032	Deposition Transcript of Mark Sturza in IPR2023-01212 (August 27, 2024)
2020	Declaration of Mark Alan Sturza
2023	Deposition Transcript of David Hilliard Williams for IPR2023-01211, -01211, -01211 (U.S. Pat. Nos. 7,561,104, 8,786,494 and 8,400,358) (April 23, 2024)
2024	Patent Owner's Statutory Disclaimer of Claims 1, 25 and 35 of the '494 Patent

CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. §42.24

The undersigned hereby certifies that the foregoing Reply totals 5,345 words, excluding the parts which are exempted by 37 C.F.R. §42.24(a)(1).

Date: September 11, 2024

/Patrick C. Keane/

Patrick C. Keane, Esq. (Reg. No. 32,858)

BUCHANAN INGERSOLL & ROONEY PC

1737 King Street, Suite 500

Alexandria, Virginia 22314

Direct Telephone (703) 838-6522

Main Facsimile (703) 836-2021

patrick.keane@bipc.com

Counsel for Petitioner

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this 11th day of September, 2024, a true and correct copy of the foregoing **PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE** are being served by electronic mail to Patent Owner's counsel as follows:

James T. Carmichael Stephen McBride Stephen Schreiner Minghui Yang CARMICHAEL IP, PLLC 8607 Westwood Center Drive, Suite 270 Tysons, VA 22182 jim@carmichaelip.com stevemcbride@carmichaelip.com schreiner@carmichaelip.com mitch@carmichaelip.com geoscopeIPRs@carmichaelip.com	Christopher M. Gerson (<i>pro hac vice</i>) Saunak K. Desai (<i>pro hac vice</i>) SCHULTE ROTH & ZABEL LLP 919 Third Avenue New York, New York 10022 chris.gerson@srz.com saunak.desai@srz.com Patent@srz.com
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Date: September 11, 2024

/Patrick C. Keane/

Patrick C. Keane, Esq. (Reg. No. 32,858)
BUCHANAN INGERSOLL & ROONEY PC
1737 King Street, Suite 500
Alexandria, Virginia 22314
Direct Telephone (703) 838-6522
Main Facsimile (703) 836-2021
patrick.keane@bipc.com
Counsel for Petitioner