

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
Patent 8,406,753

**PETITIONER'S REPLY TO
PATENT OWNER'S RESPONSE**

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PETITIONER’S EXHIBIT LIST

EX1001	U.S. Patent No. 8,406,753 to Martin Alles <i>et al.</i> (“the ’753 Patent”)
EX1002	Excerpts from the Prosecution History of the ’753 Patent (“the Prosecution History”)
EX1003	Declaration of Dr. Karthikeyan Sundaresan
EX1004	U.S. Application Publ. No. 2006/0211376 to Tarun Kumar Bhattacharya <i>et al.</i> (“Bhattacharya”)
EX1005	[RESERVED]
EX1006	U.S. Patent No. 7,783,299 to Robert J. Anderson <i>et al.</i> (“Anderson”)
EX1007	Special Mobile Group (SMG) Technical Committee (TC), European Telecommunications Standards Institute, <i>GSM Technical Specification - Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification (GSM 04.08)</i> (Dec. 1995)
EX1008	U.S. Patent No. 6,560,442 to George Yost <i>et al.</i> (“Yost”)
EX1009-EX1019	[RESERVED]
EX1020	Memorandum Opinion & Order (Docket No. 92), <i>Geoscope Technologies PTE. LTD. v Apple Inc.</i> , 1:22-cv-01373, (E.D. Va. Jul. 19, 2023)
EX1021	[RESERVED]
EX1022	Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (USPTO Jun. 21, 2022) (“Interim Procedure”)

- EX1023 Memorandum Opinion (Docket No. 109), *Geoscope Technologies PTE. LTD. v Apple Inc.*, 1:22-cv-01373, (E.D. Va. Sep. 18, 2023)
- EX1024 Notice of Appeal (Docket No. 121), *Geoscope Technologies PTE. LTD. v Apple Inc.*, 1:22-cv-01373, (E.D. Va. Nov. 29, 2023)
- EX1025 Stipulation Regarding Agreed Upon Claim Constructions (Docket No. 70), *Geoscope Technologies PTE. LTD. v Apple Inc.*, 1:22-cv-01373, (E.D. Va. May 23, 2023)
- EX1026 Transcript of Deposition of Mr. Mark Alan Sturza
- EX1027 Supplemental Declaration of Dr. Karthikeyan Sundaresan

I. INTRODUCTION

Geoscope's sole position in this proceeding requires the Board to restrict the scope of the term "grid point" by burdening it with unrecited limitations. *See generally* Paper 21 ("POR"). Geoscope presents no argument against the combinability of Bhattacharya and Yost. And Geoscope presents no argument with respect to any other claim features—whether in independent claims 1 and 32 or the dependent claims. Thus, if the Board does not accept Geoscope's invitation to improperly import limitations into the term "grid point," claims 1, 7, 9, 32, 38, and 40 of the '753 Patent (the Challenged Claims) are necessarily unpatentable.

Geoscope seeks to construe the term "grid point" to mean "a point associated with representative calibration data for an area whose boundaries are determined from evaluation of the calibration data." POR, 26. In doing so, Geoscope is taking the district court's construction and adding that the "boundaries are determined from evaluation of the calibration data." *Compare* EX1020, 20 to POR, 26. Geoscope's only intrinsic support for boundaries being determined from evaluation of calibration data, however, relates to specific example methods of generating non-uniform grid points from the '753 Patent's specification and its provisional application. This construction not only rewrites the claim to include limitations specific to these embodiments but also impermissibly reads out the '753 Patent's embodiments using uniform grid points as opposed to non-uniform grid points.

Indeed, an examination of the intrinsic record—and not just the select portions on which Geoscope limits its focus—reveals the term “grid point” encompasses both uniform grid points and non-uniform grid points. *See* Section I, *infra*. If one “grid point” may be either a uniform grid point or a non-uniform grid point, then “one or more sets of grid points” must logically encompass (1) a set of only uniform grid points, (2) a set of only non-uniform grid points, and/or (3) a set including a combination of both uniform and non-uniform grid points. And there is no dispute that the combination of Bhattacharya and Yost at least teach a set of uniform grid points.

Unable to outright deny that the term “grid point” may encompass a uniform grid point as well as a non-uniform grid point, Geoscope attempts to artificially limit what type and how many grid points may be in the claimed “one or more sets of grid points.” Specifically, Geoscope inexplicably argues that “a single generated grid point may be anchored to a point on [a] uniform grid while the other generated grid points are not, and are nonuniformly distributed.” POR, 16. In other words, under Geoscope’s construction, the “one or more sets of grid points” may contain one and only one uniform grid point, while the rest must be non-uniform grid points.

Not only is this distinction not recited in the claims, it is inconsistent with the ’753 Patent specification. The ’753 Patent explains that the set of grid points upon which location is estimated may be “NUGs or UGs,” and that “calibration point

data” may be “assigned to ... **fixed grid points** by some rule.” EX1001, 10:29-35, 25:31-34, 26:32-35¹. “[A]ny one or plural grid points may be located on a predetermined fixed uniform grid defined over the geographic region **or** randomly located within the geographic region.” EX1001, 51:31-36. The “predetermined fixed uniform grid” on which uniform grid points are located is incompatible with Geoscope’s construction, because the boundaries are “predetermined,” not determined “from evaluation of the calibration data.” Further, if multiple grid points may be “located on a predetermined fixed uniform grid,” those uniform grid points constitute a set of grid points, consistent with the independent claims. Such a set of uniform grid points would not exhibit and thus not be limited to the features of specific embodiments of non-uniform grid points, as Geoscope attempts to assert.

Accordingly, Geoscope’s claim construction for “grid point” should be rejected. And without the burden of Geoscope’s logically flawed and unsupported importation of limitations, the combination of Bhattacharya and Yost discloses the claimed “grid points” and renders the Challenged Claims obvious.

¹ Emphasis added throughout unless otherwise noted.

II. GEOSCOPE’S PROPOSED CONSTRUCTION OF “GRID POINT” SHOULD BE REJECTED BECAUSE IT IMPROPERLY IMPORTS LIMITATIONS FROM THE SPECIFICATION AND UNJUSTIFIABLY READS OUT PREFERRED EMBODIMENTS

Limitation [1b] of claim 1 and limitation [32d] of claim 32 of the ’753 Patent recite “generat[ing] one or more sets of grid points for said calibration data.” EX1001, 7:19-8:2, 63:59-60. Independent claim 1 provides no further limitation on what a “grid point” is. *See* EX1001, 14-31; *see also* EX1020, 19 (district court’s *Markman* order distinguishing between “what a grid point is” and what is done to arrive at a grid point).

The district court agreed with Apple in its *Markman* order, construing the term “grid point” to mean “a point associated with representative calibration data for an area.” EX1020, 20. In reaching this construction and rejecting an earlier and different construction from Geoscope, the district court dismissed Geoscope’s reliance upon the ’753 Patent specification’s description that “calibration data for these locations is gathered and analyzed so that particular grid points within the geographic region can be determined” EX1020, 19-20 (citing EX1001, Abstract). In reviewing these conclusions, the Institution Decision rightly concluded that “the district court was providing explanation of why the cited language was not pertinent to the meaning of ‘grid point’ and not indicating that grid points must be generated based on the measured calibration data.” Paper 11 (Institution Decision),

27. With this, the Institution Decision rejected Geoscope’s similar attempts in the POPR to relitigate the construction of the term “grid point.” *See id.*, 26-28.

Geoscope now seeks to amend the district court’s construction to add the limitation that the “boundaries [of the area of the grid point] are determined from evaluation of the calibration data.” POR, 36. However, the ’753 Patent is clear that a “grid point” is not so limited, as this requirement arises solely from disclosure explaining example methods for generating non-uniform grid points. As discussed below, the ’753 Patent makes clear that a “grid point” may be either a non-uniform grid point or a uniform grid point, and therefore Geoscope is unjustified in importing its now-preferred limitations into the term, all of which come from descriptions of non-uniform grid point embodiments and would read out uniform grid point embodiments. *See, e.g.*, EX1001, 10:29-41; 13:1-20, 19:60-67; 23:5-8, 24:14-16, 25:31-34, 26:32-35; *Phillips v. AWH Corp.*, 415 F. 3d 1303, 1323 (Fed. Cir. 2005) (the process of consulting the specification when construing a claim must “avoid the danger of reading limitations from the specification into the claim,” even where the specification “describes very specific embodiments of the invention”).

A. Geoscope Relies Exclusively on Descriptions of Non-Uniform Grid Points’s for Its Construction of “Grid Point”

As the primary support for its construction, Geoscope argues that “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.” POR, 28. Geoscope further argues that the ’753 Patent requires that “[t]he ‘[s]tatistical similarity’ of the gathered calibration data [be] 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.” POR, 30-31. “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.” POR, 31-32.

However, the teachings of the ’753 Patent specification to which Geoscope cites for these arguments exclusively relate to non-uniform grid points (“NUGs”). EX1027, ¶33. For example, the POR’s prominent block quotation from column 12 of the ’753 Patent clearly states that the “NUGs may fully cover the region R and each NUG may have statistically similar data accumulated into itself.” POR, 28 (citing EX1001, 12:7-14). Similarly, the POR’s annotation of FIG. 6 of the related ’784 Patent is admitted by Geoscope to show “a geographical region (R) having NUGs represented by NUG1, NUG2, and NUG3.” POR, 28-29 (citing EX2017 [’784 Patent], Fig. 6, 6:21-34). Further, the long section of column 10 to which Geoscope cites for the need to evaluate the calibration data for “statistical similarity” is in a paragraph describing the operation of “the NUG generator.” POR, 30-31

(citing EX1001, 10:44-11:6); EX1027, ¶33. Geoscope’s expert, Mr. Sturza, explained that the reason for this focus is that Geoscope’s position is the claimed “grid points” are all NUGs. *See* EX1026, 83:6-87:19 (concluding “they are all non-uniform grid points”).

Thus, even if all of the unclaimed limitations on which Geoscope focuses for its construction were properly attributable to a term (which they are not), that term would be “non-uniform grid point” or NUG. EX1027, ¶34. However, none of the Challenged Claims use the term “non-uniform grid point.” *See* EX1001, 59:14-31 (claim 1), 59:45-46 (claim 7), 59:51-65 (claim 9), 63:49-67 (claim 32), 64:15-16 (claim 38), 64:21-35 (claim 40); *see* EX1026, 85:18-22 (admitting that, in the claim language, “[t]here is no use of non-uniform or uniform grid points”). Rather, the Challenged Claims more generally recite the term “grid point,” and the specification describes embodiments involving both uniform and non-uniform grid points. *See* EX1001, 25:31-34, 26:32-35, 35:41-45, 59:19-20.

The broader claim language here specifically distinguishes other patents that claim priority to the same provisional application as the ’753 Patent (*i.e.*, U.S. Provisional Application No. 60/899,379). *See* POR, 10 (illustrating “[t]he family relationship between” certain Geoscope patents being challenged in IPR). For example, dependent claim 2 of the ’104 Patent claims that “said database comprises previously-gathered calibration data for one or more non-uniform grid points within

said region.” EX2016, 12:16-18. Similarly, dependent claim 4 of the ’784 Patent recites a method that “further compris[es] determining at said controller unit if said location data is statistically sufficient and if so entering said location data into a **non-uniform grid** generator.” EX2017, 9:51-54. Thus, where Geoscope wanted to focus exclusively on non-uniform grid points and the specifics of their generation, it did so with explicit claim language. EX1027, ¶35. By choosing not to include such language in the claims of the ’753 Patent, Geoscope chose not to limit the claims to these specific features. *See Home Diagnostics, Inc. v. LifeScan, Inc.*, 381 F.3d 1352, 1357-58 (Fed. Cir. 2004) (comparing the difference in claim scope between related patents to determine that a term was purposefully broadened and conclude that a “patentee may claim an invention broadly and expect enforcement of the full scope of that language absent a clear disavowal or contrary definition in the specification.”).

B. The ’753 Patent Includes Both Uniform Grid Points and Non-Uniform Grid Points as “Grid Points”

The ’753 Patent could not be clearer that its process of location estimation is based on using either uniform grid points (UGs) or non-uniform grid points (NUGs). EX1027, ¶36. For example, the ’753 Patent describes that, “[i]n a further aspect of embodiments of the present subject matter, an estimated location may be generated for a mobile device given a received NMR and a region ‘R’ over which a set ‘S’ of

grid points (NUGs or UGs) have been established.” EX1001, 25:31-34. Similarly, the ’753 Patent describes that, “[i]n a further embodiment of the present subject matter, the individual pdf of each NC power level or other parameter in the NMR over the set of available grid points (NUGs or UGs) may be evaluated.” EX1001, 26:32-35. In each of these cases, the ’753 Patent explicitly teaches that its disclosed process of location estimation may be based on a set of “NUGs or UGs.” EX1001, 25:31-34, 26:32-35; EX1027, ¶36. And the ’753 Patent is also clear that a NUG is just one example of a “grid point.” *See* EX1001, 13:11-12 (describing an example process for defining “a grid point, such as a NUG”); EX1027, ¶36. Thus, the ’753 Patent distinguishes between NUGs and UGs, and it identifies both as types of “grid points.” EX1027, ¶36.

With respect to a uniform grid point (UG), the ’753 Patent describes that “a fixed uniform grid (‘UG’) [is] defined over the region R with the calibration point data being assigned to the fixed grid points by some rule (e.g., allocated by closest fixed grid point, a centroid of a set of fixed grid points, etc.).” EX1001, 10:29-35. This is consistent with the description of the assignment of geographical coordinates to a grid point, in which “the calibration point may be located on a predetermined fixed uniform grid defined over the geographic region . . .” *See* EX1001, 13:1-20; EX1027, ¶37. According to the ’753 Patent, “one or more of the grid points may be randomly located within the geographic region, and one or more of the grid points

may be located on a **predetermined fixed uniform grid** defined over the geographic region.” EX1001, 35:41-45. In fact, dependent claims 4 and 35 recite that “one of said grid points is located on a predetermined fixed uniform grid defined over said geographic region,” confirming that the claimed “grid point” is broad enough to encompass a uniform grid point located on a predetermined fixed uniform grid. *See* EX1001, 59:38-40 (claim 4), 64:8-10 (claim 35); *see also Phillips*, 415 F. 3d at 1315 (“Differences among claims can also be a useful guide in understanding the meaning of particular claim terms,” particularly where “a dependent claim [] adds a particular limitation”); EX1027, ¶37.

The ’753 Patent describes that these uniform grid points “may serve as the root of a first NUG.” EX1001, 10:39-43. In other words, the generation of NUGs is an optional feature of the ’753 Patent, and their generation may be based on using a UG as a root. *See id.*; EX1027, ¶38. There is no requirement in the ’753 Patent—and certainly not in the claim language itself—that the grid points upon which location estimation is based are NUGs. EX1027, ¶38.

These teachings stand in stark contrast to Geoscope’s attempt to brush aside the ’753 Patent’s description of uniform grid points and their impact on the claim language. *See* POR, 15-17; EX1027, ¶39. For example, Geoscope briefly acknowledges that “the ’753 Patent claims recite the generation of ‘grid points,’ not

only ‘non-uniform grid points’ or ‘NUGs.’”² POR, 15. Geoscope is forced to make this admission because, as noted above, dependent claim 4 recites that “one of said grid points is located on a predetermined fixed uniform grid defined over said geographic region.” *See* POR, 16 (citing EX1001, cl. 4). However, to minimize this inconvenient fact, Geoscope attempts to contort the ’753 Patent’s description that NUGs may be generated using a UG as a “root” to argue that “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 nonuniformly distributed.” POR, 16.

The “one or more sets of grid points” recited in claims 1 and 32 are not so limited, particularly given that the above-noted teachings of the ’753 Patent explain

² Notably, Geoscope attempts to wave away the importance of this admission with hedging language, such as “regardless of whether the claimed grid points are ultimately uniform or non-uniform” and “regardless of whether that ultimately results in grid points that are uniform or non-uniform,” leaving it unclear what their construction even encompasses. POR, 15, 30. Indeed, Geoscope’s expert, Mr. Sturza, attempted to backtrack this admission in his deposition by refusing to acknowledge that the claimed “grid points” may include uniform grid points. *See* EX1026, 81:18-82:8. This inconsistency and lack of clarity further weighs against their proposed construction.

that the set of grid points upon which location is estimated may be “NUGs or UGs,” and that “calibration point data” may be “assigned to ... fixed grid points by some rule.” EX1001, 10:29-35, 25:31-34, 26:32-35; EX1027, ¶40. The ’753 Patent uses the disjunctive “or” to show that NUGs are just one option for the grid points, and it uses the plural when referring to uniform grid points to show that there may be multiple uniform grid points utilized in position estimation—not just the “single” anchor point Geoscope postulates. EX1027, ¶40. Furthermore, the ’753 Patent teaches that, “[o]f course, one or more of the grid points may be . . . located on a predetermined fixed uniform grid defined over the geographic region.” EX1001, 39:39-43.

These teachings of the ’753 Patent about the proper breadth of the term “grid point” are consistent with logical reasoning. EX1027, ¶41. If one claimed “grid point” can be a uniform grid point located on a “predetermined fixed uniform grid,” then without further limitation by the claims, “one or more sets” of such grid points must at least encompass a set of these uniform grid points. EX1027, ¶41. There is simply nothing in the claims or the specification to teach or even suggest to a POSITA that the claimed “one or more sets of grid points” must include only one uniform grid point or must include at least one non-uniform grid point. Certainly, the claimed “one or more sets of grid points” is also broad enough to encompass one or more non-uniform grid points, but a POSITA would understand the inclusion of

such non-uniform grid points as optional. *See* EX1001, 25:31-34, 26:32-35; EX1027, ¶41.

C. Uniform Grid Points (and Therefore “Grid Points”) Are Not “Determined from Evaluation of the Calibration Data”

By requiring that the “boundaries are determined from evaluation of the calibration data,” Geoscope’s proposed construction is improperly reading uniform grid points out of the construction of “grid point.” The ’753 Patent describes that “a **fixed uniform grid** (‘UG’) [is] defined over the region R with the calibration point data being assigned to the **fixed grid points** by some rule,” and that “one or more of the grid points may be located **on a predetermined fixed uniform grid** defined over the geographic region.” EX1001, 10:29-35, 35:41-45. A “predetermined fixed uniform grid” would not have variable boundaries that are determined by evaluation of calibration data. *See id.* Rather, as the ’753 Patent explains, the boundaries of each section of the grid would be predetermined, fixed, and uniform. *Id.* Because the term “grid point” encompasses both uniform and non-uniform grid points, for the reasons noted above, Geoscope’s construction cannot be correct, because it is inconsistent with and thus not inclusive of the express characteristics of uniform grid points. *See, e.g., Eko Brands v. Adrian Rivera Maynez Enterprises*, 946 F. 3d 1367, 1373 (Fed Cir. 2020) (rejecting a claim construction that would exclude one of several preferred embodiments); *SynQor, Inc. v. Artesyn Techs., Inc.*, 709 F.3d 1365,

1378-79 (Fed. Cir. 2013) (“A claim construction that ‘excludes the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support.’”).

For at least these reasons, Geoscope’s overly restrictive construction should be discarded. The district court’s construction is sufficient on its own and is consistent with the full and fair scope of the term “grid point.” EX1027, ¶42. Accordingly, the district court’s construction should remain unaltered.

III. BHATTACHARYA AND YOST DISCLOSE THE CLAIMED “GRID POINTS”

Geoscope argues that, “[u]nder 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.” POR, 36. As described above, Geoscope’s “proper construction” is completely unjustified by the specification of the ’753 Patent and is a clear importation of embodiment-specific limitations therefrom. Thus, Geoscope’s arguments are inapposite. Under the district court’s construction, the combination of Bhattacharya and Yost render limitations [1b] and [32d] obvious.

As discussed above, the district court construed the term “grid point” to mean “a point associated with representative calibration data for an area.” EX1020, 20. In other words a “grid point” is a collection of two pieces of data: (1) a point or location, and (2) representative calibration data for an area. EX1027, ¶44. And the

'753 Patent describes the assignment of both “geographical coordinates” and “calibration data” as part of generating a grid point. *See, e.g.*, EX1001, FIG. 3, 13:1-34. Thus, geographical coordinates alone are not a “grid point” as that term is used in the '753 Patent or as properly construed by the district court. EX1027, ¶44. A “grid point” only exists when a location and calibration data are combined. EX1027, ¶44.

Bhattacharya describes the creation of a “grid point” consistent with the district court’s construction. EX1027, ¶45. As explained in the Petition, Bhattacharya describes that “the Expected Signal-Strength Database is populated with the expected signal strengths of three signals at each location in geographic region 200.” EX1004, [0085]; *see* Paper 2 (Petition), 35-36. In other words, Bhattacharya describes the creation of an association between (1) a point or location and (2) representative calibration data for an area. *See* EX1004, [0078], [0085]-[0086], [0105]-[0117]; EX1027, ¶45. Bhattacharya describes that “the expected signal strength at each location is generated by taking empirical measurements at various locations and by interpolating for the locations in between the sampled locations.” EX1004, [0119]; Petition, 36. The generation of the “grid point” is only complete once the empirical measurements (*i.e.*, calibration data) have been provided and stored with the location. EX1027, ¶45. Accordingly, the “grid points” described by Bhattacharya are “for said calibration data,” as recited in [1b] and

[32d], because each entry in Bhattacharya's Expected Signal-Strength Database is only complete (and thus a "grid point") once the expected signal strength data has been collected and interpolated. *See* EX1004, [0119]; EX1027, ¶45.

Furthermore, in the combination of Bhattacharya and Yost set forth in the Petition, the expected signal strength data is "representative" of an area, consistent with the district court's construction. EX1027, ¶46. As explained in the Petition, "at least one known method of generating expected signal strength for a geographic point would have been to collect multiple empirical measurements within the grid square surrounding the geographic point and average the multiple empirical measurements." Petition, 37 (citing EX1008, 7:28-44; EX1003, ¶79). Geoscope has not presented any arguments against the obviousness or technical merits of this combination of Bhattacharya and Yost. *See generally* POR. As the Petition concludes without counterargument from Geoscope, "a POSITA would have understood or at least found it obvious that the expected signal strength functions $\{E(1,x,y,t), E(2,x,y,t), \text{ and } E(3,x,y,t)\}$ for a given grid point within the geographic region 200 may represent an average of calibration data from multiple locations within the grid square, and not simply represent the storage of the calibration data itself." Petition, 37-38. Accordingly, in the combination of Bhattacharya and Yost, the expected signal strength functions are "representative" of an area, consistent with the district court's construction. EX1027, ¶46.

For at least these reasons, a POSITA would have understood that the combination of Bhattacharya and Yost renders limitations [1b] and [32d] obvious under the district court's construction.

IV. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests that the Board reject Geoscope's unreasonably narrow claim construction and issue a Final Written Decision finding the Challenged Claims unpatentable.

Respectfully submitted,

Date: November 15, 2024

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CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petitioner Reply to Patent Owner Response totals 3,828 words, which is less than the 5,600 allowed under 37 CFR § 42.24(c)(1).

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that on November 15, 2024, a complete and entire copy of this Petitioner's Reply to Patent Owner's Response and its supporting exhibits were provided via email, to the Patent Owner by serving the email correspondence addresses of record as follows:

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