

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

GEOSCOPE TECHNOLOGIES PTE. LTD.,
Patent Owner.

IPR2023-01213
Patent 9,097,784 B2

Before PATRICK R. SCANLON, SHEILA F. McSHANE, and
BRIAN D. RANGE, *Administrative Patent Judges*.

RANGE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Google LLC (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1, 2, 10–13, 21 and 22 (“the challenged claims”) of U.S. Patent No. 9,097,784 B2 (Ex. 1001, “the ’784 patent”). Paper 2 (“Pet.”). Geoscope Technologies Pte. Ltd. (“Patent Owner”) filed a Preliminary Response. Paper 10 (“Prelim. Resp.”). With our permission, the parties also filed a Petitioner’s Reply (Paper 12, “Prelim. Reply”) and a Patent Owner’s Sur-Reply (Paper 13, “Prelim. Sur-Reply”). We instituted *inter partes* review of the challenged claims on all asserted grounds. Paper 14 (“Dec.”).

After institution, Patent Owner filed a Patent Owner Response (Paper 19, “PO Resp.”), Petitioner filed a Reply (Paper 24, “Pet. Reply”), and Patent Owner filed a Sur-Reply (Paper 27, “PO Sur-Reply”). An oral hearing was held on the morning of November 20, 2024¹, and a transcript of the hearing is included in the record (Paper 45, “Tr.”). We have jurisdiction under 35 U.S.C. § 6. This decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 10, 12, 13, 21 and 22 of the ’417 patent are unpatentable. We decline to address claim 11 because any dispute concerning claim 11 is moot.

II. BACKGROUND

A. *Related Matters*

The parties identify the following related judicial matters: *Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.*, No. 1:22-cv-01331

¹ A separate oral hearing involving the same parties was held for IPR2023-01209, IPR2023-01210, IPR2023-01211, and IPR2023-01212 on the afternoon of November 20, 2024.

(EDVA); *Geoscope Technologies Pte. Ltd. v. Apple Inc.*, No. 1:22- cv-01373 (EDVA); *Geoscope Technologies Pte. Ltd. v. Google LLC*, No. 24-1003 (Fed. Cir.); and *Geoscope Technologies Pte. Ltd. v. Apple, Inc.*, No. 24-1018 (Fed. Cir.). Pet. 3; Paper 4, 1–2; Paper 11, 1–2.

Patent Owner further identifies the following proceedings as related matters: IPR2023-01209 (U.S. Patent No. 7,561,104), IPR2023-01210 (U.S. Patent No. 8,400,358), IPR2023-01211 (U.S. Patent No. 8,786,494), IPR2023-01212 (U.S. Patent No. 8,406,753), IPR2024-00031 (U.S. Patent No. 8,400,358), IPR2024-00032 (U.S. Patent No. 8,786,494), IPR2024-00255 (U.S. Patent No. 7,561,104), and IPR2024-00259 (U.S. Patent No. 8,406,753). Paper 11, 1–2.

B. The '784 patent

The '784 patent is titled “System and Method to Collect and Modify Calibration Data.” Ex. 1001, code (54). The '784 patent explains that estimating the location of a mobile station requires calibration data such as those pertaining to signal strength, round trip time, time difference of arrival (TDOA), ground truth data, etc. *Id.* at 1:25–28. Additionally, the '784 patent states that “[a]ny device used to retrieve ground truth data may produce some degree of signal degradation or drop-out.” *Id.* at 1:33–34. According to the '784 patent, without accurate ground truth information, a calibration database “will contain significant errors which will in turn be reflected by poor location estimates.” *Id.* at 1:31–33. The '784 patent also explains dead reckoning is a process that provides a remedy in which a GPS satellite is used but this process, however, can produce unsatisfactory results. *Id.*, code (57), 1:44–60. Thus, the '784 patent purports to provide “a method for generating a calibration database that may be used to locate a mobile

station,” while ensuring integrity of the collected data via data modification or by using a data replacement algorithm. *Id.* at 1:64–2:12, code (57).

The ’784 patent discloses a method for generating a calibration database that employs a wireless device in a region that contains plural streets and intersections of the plural streets. *Id.* at 2:21–24. As an example, the ’784 patent discloses that a vehicle may be configured with a collection device to collect calibration data to be stored in a calibration database. *Id.* at 1:38–43. Exemplary collection devices include a GPS receiver that receives satellite location signals and a terrestrial geo-location device that measures the strengths of signals received from base stations and other wireless signaling devices. *Id.* at 3:29–35. Location data obtained from multiple collection devices can be compared to ensure the data’s integrity. *Id.* at 3:35–38. The ’784 patent discloses that a controller unit “may monitor the statistical sufficiency of the data available for the current location” of a collection device. *Id.* at 6:5–7.

The ’784 patent states that “[g]round truth data observed from a data collection device (i.e., a GPS receiver) may be collected and stored in a calibration database and compared to” data in a “street database” to modify and enhance calibration data for increased accuracy. *Id.* at 3:23–26. The ’784 patent discloses that, thus, the “street database” is used as a supplemental data source to compare and/or check the integrity of collected location data. *Id.* at 3:42–44. The ’784 patent discloses that the “street database” may be a compilation of latitude, longitude and other forms of geographical location data that “provide ancillary information such as the direction of one-way streets, off-street territories, etc.” *Id.* at 3:44–48. Data integrity of collected data can be checked by “matching each data point to

the closest street in the street database” or matching a set of points “to a particular street based on the proximity of a group of points.” *Id.* at 4:7–12.

Figure 9 of the ’784 patent is reproduced below.

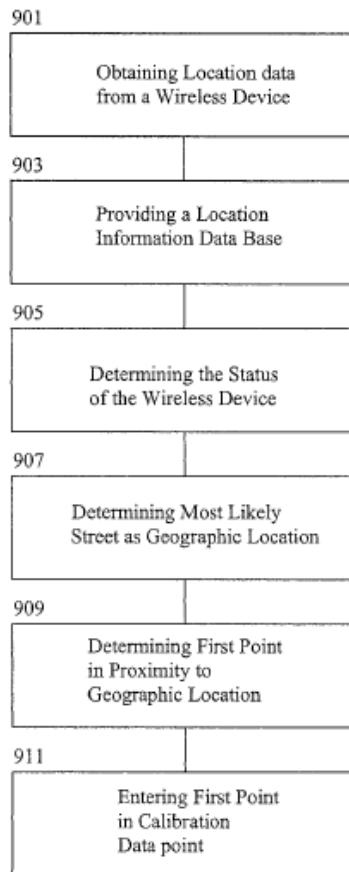


Figure 9

Figure 9 is a flow diagram of a method for generating a calibration database using a wireless device. *Id.* at 3:18–19, 8:55–56.

The ’784 patent discloses that starting at step 901, location data is obtained for a plurality of geographic locations situated within a region having plural streets and intersections using a wireless device. *Id.* at 8:56–60. At step 903, a location information database, such as a “street database,” having accurate latitude and longitude information for plural points in the

same geographic region is used. *Id.* at 8:60–63. The status of the wireless device is then determined at step 905. *Id.* at 8:63–64. Thereafter, based upon the status, a most likely street upon which the wireless device is sited is determined as the geographic location at step 907. *Id.* at 8:64–66. A first point from the location information database that is in proximity to the first geographic location is determined at step 909. *Id.* at 8:66–9:1. Finally, at step 911, the first point is then entered in the calibration database. *Id.* at 9:1–2.

C. Illustrative Claim

In the Petition, Petitioner challenges claims 1, 2, 10–13, 21 and 22. Pet. 1. Claims 1 and 12 are independent claims. Ex. 1001, 9:17–43, 10:10–33. As discussed below, we do not address the challenge to claim 11 because that claim has been previously determined, with finality, to be unpatentable. Claims 2 and 10 depend from claim 1. *Id.* at 9:44–46, 10:5–9. Claims 13, 21, and 22 depend from claim 12. *Id.* at 10:34–37, 10:60–64. Claim 1 is reproduced below.

1. [preamble] A method for generating a calibration database, comprising;
 - [1.1] receiving at a wireless device an attribute of a signal transmitted by a wireless transmitter to a mobile station in a region;
 - [1.2] wirelessly transmitting from said wireless device said attribute to a controller unit;
 - [1.3] obtaining location data of a plurality of geographic locations situated within said region, wherein said location data is determined using said wireless device, and wherein said region contains plural streets and intersections of said plural streets;

- [1.4] providing a location information database wherein said location database includes latitude and longitude information for each of a plurality of points within said region;
- [1.5] determining a status of said wireless device;
- [1.6] determining from said status a most likely one of said plural streets upon which said wireless device is located;
- [1.7] determining said most likely street as a first one of said plural geographic locations;
- [1.8] determining a first point of said plural points that is in proximity to said first geographic location; and
- [1.9] entering said first point in said calibration database and associating the location data for the first one of said plural geographic locations determined by said wireless device with the first point.

Id. at 9:17–43 (adding Petitioner’s notation identifying claim elements at Pet. 20–45).

D. Asserted Ground of Unpatentability

Petitioner, supported by the Declaration of David H. Williams (Ex. 1008), asserts the following ground of unpatentability (Pet. 6):²

Claims Challenged	35 U.S.C. §	References/Basis
1, 2, 10, 12, 13, 21, 22 ³	103(a)	Crane, ⁴ Spain ⁵

² The relevant sections of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, took effect on March 16, 2013. The ’784 patent claims priority to applications with filing dates before this date. *See* Ex. 1001, code (60), (63). For the purposes of this Decision, pre-AIA statutes apply.

³ Again, as discussed below, claim 11 has been previously determined to be unpatentable.

⁴ US 6,381,533 B1, issued April 30, 2002, Ex. 1004 (“Crane”).

⁵ US 2003/0064735 A1, published April 3, 2003, Ex. 1005 (“Spain”).

Petitioner contends that all references cited in the ground of unpatentability qualify as prior art under pre-AIA 35 U.S.C. § 102(b). Pet. 7. Patent Owner does not challenge the availability of any of the references as prior art. Based on the dates of the Crane and Spain references, we find by the preponderance of the evidence that Crane and Spain qualify as prior art to the '784 patent.

III. ANALYSIS

A. *Legal Standard*

“In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring inter partes review petitions to identify “with particularity ... the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and “the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective

evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).⁶

B. Level of Ordinary Skill in the Art

In order to determine whether an invention would have been obvious at the time the application was filed, we consider the level of ordinary skill in the pertinent art at the critical time. *Graham*, 383 U.S. at 17. The resolution of this question is important because it allows us to “maintain[] objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quotation omitted). Generally, it is easier to establish obviousness under a higher level of ordinary skill in the art. *Innovation Toys, LLC v. MGA Entm’t, Inc.*, 637 F.3d 1314, 1323 (Fed. Cir. 2011) (“A less sophisticated level of skill generally favors a determination of nonobviousness . . . while a higher level of skill favors the reverse.”).

Petitioner asserts that one of ordinary skill in the art:

would have been someone knowledgeable in wireless networks, cellular radio systems, mobile communication devices and radio navigation systems, having at least a bachelor’s degree in electrical engineering, with a background in radio frequency communications and/or navigation system technology as well

⁶ The parties have not presented arguments regarding objective indicia.

as approximately two years of industry experience working on radio communication and/or navigation systems.

Pet. 14 (citing Ex. 1008 ¶ 40). Patent Owner does not dispute Petitioner’s definition for the level of ordinary skill in the art. PO Resp. *passim*.

Here, we adopt Petitioner’s proposal as reasonable and consistent with both the prior art and the ’784 patent disclosure. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art may reflect an appropriate level of skill in the art).

C. Claim Construction

In an *inter partes* review proceeding based on a petition filed on or after November 13, 2018, a patent claim shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b) (as amended Oct. 11, 2018). This rule adopts the same claim construction standard used by Article III federal courts, which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. Under this standard, the words of a claim are generally given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *See Phillips*, 415 F.3d at 1312–13.

Petitioner proposes the claim constructions reproduced below. Pet. 15–18. Independent claims 1 and 12 of the ’784 patent each recite the first four terms, and the fifth term relates to claim 1. Ex. 1001, 9:16–43; 10:9–33.

CLAIM TERM	PETITIONER’S PROPOSED CONSTRUCTION
wireless device	“a device capable of transmitting and receiving signals while unattached to any physical wires”

CLAIM TERM	PETITIONER’S PROPOSED CONSTRUCTION
status of said wireless device	“information regarding the movement or orientation of the wireless device”
determining said most likely street as a first one of said plural geographic locations	encompasses “determining a street upon which a wireless device is most likely located as a first geographic location of a geographic region”
determining a first point of said plural points that is in proximity to said first geographic location	encompasses “determining a point of the location information database that is in proximity to the first geographic location” and “in proximity” encompasses “where the ‘first point’ and ‘said first geographic location’ match (<i>e.g.</i> , are the exact same location)”
order of “obtaining” and “determining” steps	““obtaining ...’ and ‘determining from said status ...’ must occur before ‘determining said most likely street ...,’ which must occur before ‘determining a first point of said plural points ...’”

Pet. 15–18. Petitioner’s proposed constructions are consistent with the claim construction decision from related litigation or the parties’ prior stipulations regarding claim construction. *Id.*; Ex. 1023 (parties’ stipulation); Ex. 1027 (parties’ stipulation); Ex. 1028, pp. 24–32 (District Court order). Patent Owner does not dispute Petitioner’s proposed claim construction. PO Resp. *passim*.

We note that, the District Court held, in a non-final order, that claims 1 and 12 were indefinite because of the term “in proximity.” Ex. 1028, 24–28. The District Court, however, did not issue a final ruling with respect to claims 1 and 12 because the parties narrowed the dispute concerning the ’784 Patent to only claim 11. Ex. 2018, ¶ 3. We also note that we do not

need to assess whether or not the term “in proximity” renders claims 1 and 12 indefinite to assess the Petition. Rather, we agree with Petitioner that the “in proximity” language is at least broad enough to “encompass” the matter set forth in Petitioner’s claim construction. *See* Pet. 17, 37–41. This is sufficient definition to make it logically possible to reach the merits of Petitioner’s challenge. *See Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 813 (Fed. Cir. 2021) (holding that indefiniteness only precludes a patentability determination 102 or 103 if the indefiniteness makes it “logically impossible” to reach such a decision).

We determine that no other claim terms require express construction for purposes of this Decision. *See, e.g., Nidec Motor Corp. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Relevant Procedural History and Dependent Claim 11

The Petition, filed August 9, 2023, challenges claims 1, 2, 10–13, 21, and 22 of the ’784 patent based on 35 U.S.C. § 103. Pet. 6.

On November 22, 2022, Patent Owner filed a complaint against Petitioner alleging infringement of the ’784 patent. Ex. 2018 ¶ 1 (parties’ stipulation summarizing litigation). On June 12, 2023, Patent Owner narrowed the litigation to assert only claim 11 of the ’784 patent against Petitioner. *Id.* at ¶ 3. Claim 11 depends directly from claim 1. Ex. 1001, 10:7–9.

In an Order dated July 19, 2023, the United States District Court for the Eastern District of Virginia held that the term “in proximity” is

indefinite. Ex. 1028, 24–28. Both independent claims of the ’784 patent, claims 1 and 12, recite “in proximity.” Claim 1 of the ’784 patent recites “in proximity” as part of the phrase “determining a first point of said plural points that is in proximity to said first geographic location.” Ex. 1001, 9:38–39. Claim 12 similarly recites “circuitry for determining a first point of said plural points that is in proximity to said first geographic location.” *Id.* at 10:28–29.

In the same Order, the District Court also held that “determining said most likely street as a first one of said plural geographic locations” is an indefinite claim term. Ex. 1028, 28–30. Both independent claims of the ’784 patent recite this phrase, with claim 1 including this “determining” step as part of its method and claim 12 including “circuitry for” performing this “determining” step. Ex. 1001, 9:36–37; 10:26–27.

On August 22, 2023, based on the District Court’s indefiniteness determination, the parties stipulated “that the Court may enter judgment of invalidity of asserted claim 11 of the ’784 patent.” Ex. 2018 ¶ 7. The District Court entered partial judgment on September 18, 2023. Ex. 2019 (order entering judgment of invalidity of claim 11 of the ’784 patent); Ex. 2020 (judgment pursuant to order). Although the Patent Owner’s stipulation reserved Patent Owner’s right to appeal the District Court indefiniteness determination (Ex. 2018 ¶ 7), Patent Owner chose not to appeal. Prelim. Resp. 6. We note that the District Court did not reach a final judgment as to independent claims 1 or 12.

In the context of litigation against Apple Inc., Patent Owner entered a similar stipulation as to claim 11 of the ’784 patent. Ex. 2021 ¶ 7. The District Court entered a similar order and judgment. Ex. 2022; Ex. 2023.

Again, Patent Owner chose not to appeal. Prelim. Resp. 6.

Because the District Court decision has determined, with finality, that claim 11 is invalid, any further assessment of claim 11 is moot. We terminate this proceeding with respect to claim 11 and dismiss the Petition with respect to claim 11. *See Google LLC v. Uniloc 2017 LLC*, IPR2020-00396, Paper 32, 3–4 (July 29, 2021) (dismissing Petition and terminating as to one claim where the claim was previously adjudicated invalid with all appeals exhausted).

E. Overview of the Asserted Art

1. Crane (Exhibit 1004)

Crane describes a data collection system and a method that match the positions of one or more cellular phones “to data indicating the locations of roads in a geographic area to derive data about phones located in vehicles traveling along the roads.” Ex. 1004, code (57). Crane discloses that data of “phones located in vehicles traveling along the roads are used for updating or refining a geographic database, traffic monitoring and reporting, or for other purposes.” *Id.*

Crane explains that “[t]here are various available technologies that can be used to determine the positions of cellular phones in an area” such as those “used to locate a cellular phone user who dials an emergency number, e.g., ‘911.’” *Id.* at 3:7–11. Crane states that “[a]ny such technology that is presently available or that becomes available in the future may be suitable for the phone location determining system 104 in FIG. 1.” *Id.* at 3:11–13.

Figure 1 of Crane is reproduced below.

FIG. 1

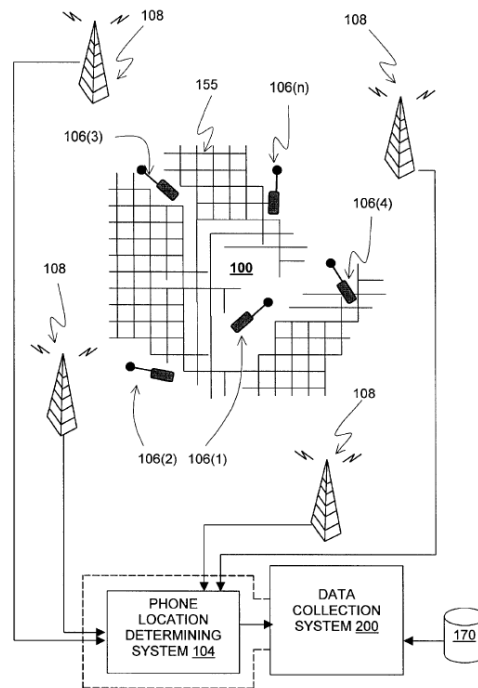


Figure 1 is an illustration of a cellular phone location determining system 104 located in a geographic region, wherein the cellular phone location determining system is used as a component of a data collection system 200. *Id.* at 2:36–40.

Figure 1 of Crane shows phone location determining system 104 with towers 108 throughout a geographic area 100 that encompasses positions 130 of cellular phones 106 (positions 130 are not labeled in Figure 1 but are shown in Figure 2). *Id.* at 3:1–7, 3:16–25. Crane discloses that phone location determining system 104 “outputs data 140 identifying the phone, the position (e.g., geographic coordinates, relative coordinates, etc.), and a time stamp (e.g., the absolute or relative time at which the identified cellular phone was at the identified position).” *Id.* at 3:27–32.

Figure 3 of Crane is reproduced below.

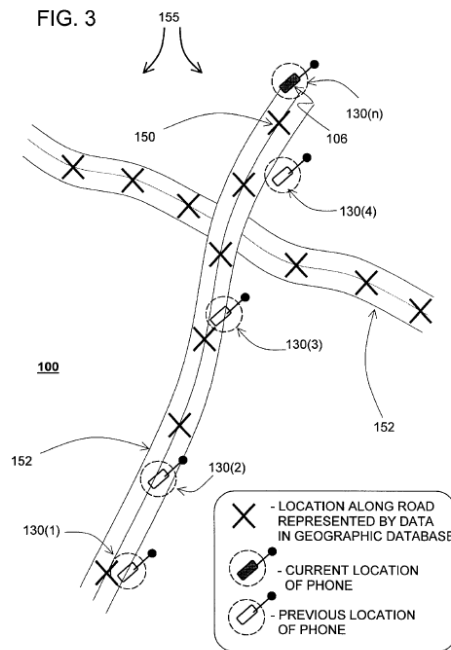


Figure 3 illustrates a series of positions of the cellular phones of Figure 1 overlaid on a map of a portion of the road network. *Id.* at 2:45–47.

Crane discloses that in geographic area 100 are roads 152 that form a road network 155 represented by data 170 in geographic database 172 (data 170 and geographic database 172 are shown in Figure 4 rather than Figure 3). *Id.* at 3:32–37. Points 150 are positions along roads 152 and 174 are data of coordinates of points 150 which are part of data 170. *Id.* 3:39–40, 3:45–46.

Crane discloses “data collection system 200 uses the data 140 collected by the cellular phone location determining system 104 in conjunction with the data 170 from the geographic database 172 to generate new data 210.” *Id.* at 3:49–52. “The data collection system 200 matches the acquired cellular phone position data 140 to the locations of roads 152 represented by the data 170 in the geographic database 172.” *Id.* at 3:52–56. Crane discloses that its matching process includes analysis of: whether “the

cellular phone is on or within a certain threshold distance of the position of a road 152 or is moving,” whether “the cellular phone can be assumed to be in a vehicle traveling along the actual road,” and determining “a rate of travel of the cellular phone.” *Id.* at 4:4–7, 4:20–25.

2. *Spain (Ex. 1005)*

Spain “relates . . . to wireless communication systems.” Ex. 1005 ¶ 2. Spain explains that pertinent to mobile communication systems, GPS based location computation is “not always reliable since the mobile unit may be in an environment where there is no penetration of the GPS satellite signals.” *Id.* ¶ 4. Spain purports to resolve this and other “disadvantages associated with techniques in the prior art” by providing a “computationally-efficient technique for reducing the number of possible positions that have to be analyzed.” *Id.* ¶ 5. Consequently, Spain discloses “[a] method for determining the location of a mobile unit” using a “spectral fingerprint” in which the “observed signal strength of a predetermined set of signals in the RF spectrum constitutes a fingerprint.” *Id.* ¶ 35.

Spain discloses a mobile unit containing a component “for tuning to a predetermined portion of the RF spectrum.” *Id.* ¶ 37. The mobile unit includes “the appropriate circuitry and software to capture the required signals and their parameters.” *Id.* ¶ 43. A communication link between the mobile unit and a location server is made “through the base stations and base station controllers of the cellular network.” *Id.* ¶ 37. As one possible parameter of the spectral fingerprint, “the identity of the signal source (e.g., channel number or station code) is used” to generate a spectral fingerprint. *Id.* ¶ 41. The generated fingerprint is then compared with the fingerprints in a database stored in the mobile unit and “the fingerprint in the database that

is closest to the generated fingerprint is selected as the match.” *Id.* ¶ 47.

Spain discloses that “the fingerprint database is generated by computer calculations with RF prediction models using certain parameters which depend on the type of buildings, terrain features, time of the day, environmental and seasonal conditions, etc.” *Id.* ¶ 52. In one embodiment, “either Support Vector Machines for Regression or Regularized Regression can be used to learn each mapping of position versus fingerprint (measured or predicted signal strengths)” in which “[p]osition will be used as the input value, while signal strength will be used as the target value.” *Id.* ¶ 54.

F. Unpatentability over Crane and Spain

Petitioner asserts that claims 1, 2, 10, 12, 13, 21, and 22 are unpatentable under 35 U.S.C. § 103(a) as having been obvious over Crane in view of Spain, citing the Declaration of Mr. Williams for support. Pet. 19–53 (citing Ex. 1008). Below, we address each of these claims.

a. *Claim 1*

[1.pre] A method for generating a calibration database, comprising

Petitioner argues that, to the extent the preamble is limiting, Crane discloses this recitation. Pet. 20–21 (citing Ex. 1004, 3:49–55; 6:56–58, 62–65; Ex. 1008 ¶¶ 85–90).

Patent Owner does not dispute this contention. *See generally* PO Resp. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378. Based on the entire trial record, we agree with Petitioner’s analysis and credit Mr. William’s testimony supporting Petitioner’s position. Thus, in view of the evidence of record, we find that Crane discloses the preamble of claim 1.

*[1.1] receiving at a wireless device an attribute of a signal
transmitted by a wireless transmitter to a mobile station in a region*

Petitioner argues that Crane and Spain teach this claim limitation. Pet. 21–26. Crane teaches cellular phones (a wireless device) including hardware and software to determine and collect geographic location. Ex. 1004, 1:13–20, 7:33–50. Thus, Crane discloses mobile stations and wireless devices that receive and transmit wireless signals. Ex. 1008 ¶¶ 93–96. Crane also discloses a geographic area including base stations and towers. Ex. 1004, Fig. 1, 2:36–39; 2:66–3:7, 3:1–7; Ex. 1008 ¶ 97–99. Petitioner illustrates this point by annotating Figure 6 of the ’784 patent and Figure 1 of Crane. Pet. 22–23 (figure not reproduced here).

Petitioner argues that, according to the ’784 patent, an attribute of a signal can be, for example, “signal strength, Cell global identity, broadcast control channel, base identity code.” Pet. 24; *see also* Ex. 1001, 9:43–46 (claim 2 providing possibilities for the “said attribute”). Petitioner states that Crane “does not expressly disclose details by which a cellular phone’s location is determined by ‘phone location determining system 104’” and “does not expressly state that its cellular phones receive ‘an attribute of a signal’ from a wireless transmitter.” Pet. 23–24.

Petitioner argues that “‘an attribute of a signal’ may encompass ‘information of a signal transmitted by a wireless transmitter.’” Pet. 23–24 (quoting Ex. 1001, 5:59–64). Petitioner further argues that Crane’s cellular phones and system are described as using “911” cellular phone technologies and that Crane contemplates referencing other documents for such technologies. Pet. 24 (citing Ex. 1004, 3:7–13; Ex. 1008 ¶ 104). Petitioner cites Spain as describing a mobile station and wireless device with such 911

technology. *Id.* at 24–25 (citing Ex. 1005 ¶¶ 30–32, 37, Fig. 1; Ex. 1008 ¶¶ 105–107). Petitioner argues that the “base station” of Spain is the claimed “transmitter.” *Id.* at 25 (citing Ex. 1008 ¶¶ 108–109). Spain teaches that its “data is communicated in both directions” and that “signals and their parameters” are used as part of its location determination system. Ex. 1005 ¶¶ 31, 37, 41, 43; Ex. 1008 ¶¶ 106–110.

Petitioner argues that it would have been obvious to implement Spain’s location determination system as part of Crane’s system and that such an implementation would have a reasonable expectation of success. Pet. 26 (citing Ex. 1008 ¶¶ 111–112).

Patent Owner does not dispute Petitioner’s contentions regarding this recitation. Based on the entire trial record, we agree with Petitioner’s analysis and credit Mr. William’s testimony supporting Petitioner’s position. Thus, in view of the evidence of record, we find that Crane and Spain disclose the preamble of recitation 1.1.

[1.2] wirelessly transmitting from said wireless device said attribute to a controller unit

Petitioner argues that Crane’s “data collection system 200” is the claimed “controller unit.” Pet. 26–27 (citing Ex. 1004, 3:4–7, 49–59, 6:46–61, Figs. 4, 7, 8; Ex. 1008 ¶¶ 114–117). Petitioner argues that Crane does not explicitly disclose transmission of an “attribute of a signal” but explains that Spain teaches this recitation as Petitioner discusses when addressing element [1.1]. *Id.* at 27 (citing Ex. 1008 ¶ 118). Petitioner further argues that Spain teaches this recitation and persuasively asserts that it would have been obvious to implement Spain’s attribute into Crane’s location determining

system with a reasonable expectation of success. *Id.* at 27–28 (citing Ex. 1005 ¶¶ 31, 37, 43, Fig. 1; Ex. 1008 ¶¶ 119–21).

Patent Owner does not dispute Petitioner’s contentions regarding this recitation. Based on the entire trial record, we agree with Petitioner’s analysis and credit Mr. William’s testimony supporting Petitioner’s position. Thus, in view of the evidence of record, we find that Crane and Spain disclose recitation 1.2.

[1.3] obtaining location data of a plurality of geographic locations situated within said region, wherein said location data is determined using said wireless device, and wherein said region contains plural streets and intersections of said plural streets

Petitioner argues that Crane discloses obtaining location data using Crane’s “phone location determining system 104” for generating an updated geographic database with “new, more accurate data” (i.e., a calibration database. Pet. 28. Petitioner further argues that Crane discloses providing wireless device status as discussed above. *Id.* Petitioner illustrates how Crane teaches this recitation by reproducing and annotated Figure 4 of the ’784 patent with Figure 3 of Crane. *Id.* at 29–30 (citing Ex. 1008 ¶¶ 132–133) (figure not reproduced here). Petitioner concludes that Crane discloses the recitations of [1.3]. *Id.* at 30; *see also* Ex. 1004, 3:49–52, 4:27–34, 6:56–58, Fig. 3; Ex. 1008 ¶¶ 123–135.

Patent Owner does not dispute Petitioner’s contentions regarding this recitation. Based on the entire trial record, we agree with Petitioner’s analysis and credit Mr. William’s testimony supporting Petitioner’s position. Thus, we find that Crane discloses recitation 1.3.

[1.4] providing a location information database wherein said location database includes latitude and longitude information for each of a plurality of points within said region

Petitioner argues that Crane discloses providing a location information database (e.g., geographic database 172) containing latitude and longitude information for plural points. Pet. 31; *see also* Ex. 1004, 3:44–48, Figs. 3–4; Ex. 1008 ¶¶ 139–141.

Patent Owner does not dispute Petitioner’s contentions regarding this recitation. Based on the entire trial record, we agree with Petitioner’s analysis and credit Mr. William’s testimony supporting Petitioner’s position. Thus, in view of the evidence of record, we find that Crane discloses recitation 1.4.

[1.5] determining a status of said wireless device

Petitioner argues that Crane teaches determining the status of its cellular phones. Pet. 32–33 (citing Ex. 1004, 4:27–34, Figs. 3–4; Ex. 1008 ¶¶ 142–146).

Patent Owner does not dispute Petitioner’s contentions regarding this recitation. Based on the entire trial record, we agree with Petitioner’s analysis and credit Mr. William’s testimony supporting Petitioner’s position. Thus, we find that Crane discloses recitation 1.5.

[1.6] determining from said status a most likely one of said plural streets upon which said wireless device is located

Petitioner argues that Crane discloses from the status (e.g., direction of travel, rate of travel) the most likely street upon which the cellular phone is located. Pet. 33–35. Petitioner quotes the following passage from Crane in order to support its argument:

[T]he data collection system 200 includes a process 256 that matches the acquired cellular phone positions 140 to positions of roads 152 which are represented by the data 170 in the geographic database 172....

The matching process 256 optionally includes other processes 260 that perform analysis and filtration of the data 140. The analysis and filtration processes 260 may make use of several assumptions and/or observations.... For example, if the acquired cellular position data 140 ***indicate that the cellular phone is on or within a certain threshold distance of the position of a road 152 or is moving, the cellular phone can be assumed to be inside of a vehicle traveling along the road*** [152].... The analysis process 260 computes a distance 270 between each of the locations 130 of the phone and the straight dashed lines 266 which represent the roads. ***If the distances 270 are sufficiently small, the cellular phone can be assumed to be in a vehicle traveling along the actual*** [i.e., most likely] ***road***.

Id. at 33–34 (quoting Ex. 1004, 3:57–4:22⁷) (Petitioner’s emphasis added).

Petitioner argues, based on this passage and its declarant’s testimony, that Crane teaches using status of the cellular phone (i.e., direction of travel in relation to distance from known roads, whether it is moving, and/or rate of travel) to determine the most likely street the vehicle is traveling along. *Id.* at 34–35 (citing Ex. 1008 ¶¶ 150–152).

Patent Owner argues that Crane does not teach using that status to determine “a most likely” street—out of a plurality of streets—that the wireless device is located upon. PO Resp. 1. Patent Owner argues that Crane, at best, determines whether a mobile device is on some street but does not determine the most likely street. *Id.* at 1–2. Patent Owner argues that “Crane makes clear that its system does ***not*** differentiate between

⁷ Petitioner’s citation has a typographical error and refers to “Ex1004, 3:57–47.” Pet. 34. Petitioner’s intended citation, however, is clear because Petitioner provides the exact quotation.

streets, and is only able to determine whether a mobile device is on a street at all.” PO Resp. 3. To support this argument, Patent Owner refers to Crane Figure 3 and argues that Crane refers to “plurality of roads 152” and labels two different streets with “152.” *Id.* (citing Ex. 1004, 3:33–36, 4:8–13 (referring to “the actual roads (152 shown in FIG 3.)). Patent Owner argues that Figure 6 similarly uses “152” to depict two different streets. *Id.* at 4.

Petitioner argues that Crane determines “the actual road” the phone is on. Pet. Reply 4 (citing Ex. 1004, 4:4–9, 4:20–22, Ex. 1008 ¶¶ 150–151). With respect to Figures 3 and 6, Petitioner argues that these are merely exemplary embodiments. *Id.* at 6 (citing Ex. 1004, 3:15, 5:5). Petitioner also argues that the label 152 is also referenced in connection with Figures 4 and 5 of Crane and that Crane states, at column 4, lines 4–14 that “if the acquired cellular position data 140 indicate that the cellular phone is on or within a certain threshold distance of the position of *a road 152* or is moving, the cellular phone can be assumed to be inside of a vehicle traveling along *the road.*” *Id.* at 7 (Petitioner’s emphasis). Petitioner argues that Patent Owner’s argument that Crane is “indifferent to which road the device is located on” goes against Crane’s teachings. *Id.* at 6–7.

The preponderance of the evidence supports Petitioner’s position. Crane explains, in the context of Figure 5, that its method computes a distance 270 between each of a series of locations 130 determined for a single cellular phone over a period of time and “dashed lines 266 which represent the roads.” Ex. 1004, 4:17–22; *see also id.* at 3:16–32 (explaining locations 130). Crane explains that when the distances 270 are sufficiently small, “the cellular phone can be assumed to be in a vehicle traveling along *the actual road.*” *Id.* at 4:20–22 (emphasis added). We find that, in the

context of Crane as a whole, a person having ordinary skill in the art would have understood Crane's reference to "the actual road" as referring to a particular actual road. The purpose of Crane is to "determine[] the positions of cellular phones." *Id.* at 1:13–19. The determination can be used for "traffic monitoring, or for other purposes." *Id.*; *see also id.* at code (57) (suggesting its method may be used for "traffic monitoring and reporting"). Nothing in Crane suggests, as Patent Owner argues (PO Reply 4), that there would be value or purpose in determining whether or not a phone is on some road yet remaining indifferent to the actual location of the phone (i.e., which road the device is located on).

Crane further explains that its method may consider "a plurality of locations for a single phone over a period of time," rate of travel, direction of travel, and "distances of the cellular phone locations from the centerline of the road" to "determine a probability that the cellular phone is located in a vehicle traveling along *the road*." Ex. 1004, 4:23–43 (emphasis added). Direction of travel and distance from the centerline of a particular road are useful data to consider when determining if a phone is traveling along a particular road; this data would not be less valuable if Crane merely wanted to know if the phone was traveling along some road. Thus, Crane's reference to "the road" here also supports that Crane seeks to determine a particular actual road that the phone is traveling along.

Patent Owner emphasizes that Crane refers to "plurality of roads 152" and labels, at Figures 3 and 6, more than one road with "152". PO Resp. 3–4. Figures 3 and 6, however, also refer to the entire diagram as "road network 155 in the geographic area 100." Ex. 1004, Figs. 3, 6, 3:35–38 ("the road network 155 is represented by data 170 in a geographic database 172").

Crane states that “the roads 152 ... form the road network 155.” *Id.* at 3:45–48. Thus, Crane differentiates between the road network and the plurality of roads. Given this context, when Crane refers to the data “indicat[ing] that the cellular phone is on or within a certain threshold distance of the position of *a road 152* or is moving, the cellular phone can be assume to be inside of a vehicle traveling along *the road*” (Ex. 1004, 4:4–8), a person having ordinary skill in the art would have understood this passage as referring to a particular road 152 (“a road 152”) among the plurality of roads 152 and refers to determining whether or not the phone is traveling along a particular road (“the road”) rather than merely determining whether or not the phone is on the road network 155. Patent Owner’s argument does not account for Crane distinguishing the road network 155 and the roads 152 in its discussion. *See* Tr., 20:21–21:1 (counsel for Patent Owner failing to meaningfully distinguish between road network 155 and “group of roads” 152).

Petitioner’s witness, David Williams, interprets the relevant passages of Crane as teaching using the status of the phone to determine “the most likely street (e.g., 152) that the vehicle carrying the cellular phone is travelling along.” Ex. 1004 ¶¶ 150–152. We find that the testimony of Williams is credible because it is consistent with the evidence of record, as discussed above. Further, Patent Owner does not dispute Williams’s credible testimony on this issue and Patent Owner presents no evidence to the contrary.

We further note that, as we discuss in Section III(C), *supra*, we construe “status of said wireless device” to mean “information regarding the movement or orientation of the wireless device,” and Patent Owner does not

dispute this construction. Crane teaches first determining, based on whether the cellular phone “is moving” (in other words, information regarding the movement or “status”), that the cellular phone is inside of a vehicle traveling along a road. Ex. 1004, 4:4–8. The Crane system combines this status information with a calculation of what road is nearest to determine an “actual road.” *Id.* at 4:1–22. Thus, Crane teaches determining “from said status” which actual road the phone is located on. The status is part of the total process that makes the determination.

Crane also teaches using location information to determine which actual road the phone is located on. *Id.* at 4:17–22. Claim 1, however, does not require that a road determination be made *only* “from the status.” Rather, claim 1 merely requires that the determination come “from” the status. Claim 1 remains open to other information *also* being used to reach the determination. Thus, in view of the evidence of record, Petitioner has established by a preponderance of the evidence that Crane discloses or suggests this claim recitation.

[1.7] determining said most likely street as a first one of said plural geographic locations

As we explain in Section III(C), *supra*, we construe this recitation as encompassing “determining a street upon which a wireless device is most likely located as a first geographic location of a geographic region.” Although the District Court determined that it “cannot decipher” the meaning of this claim term (in the context of issuing a ruling as to claim 11), Patent Owner does not dispute Petitioner’s position that, even if the full scope is uncertain, this recitation at least encompasses this construction. Ex. 1028, 28–30 (District Court ruling); PO Resp. *passim* (Patent Owner not

disputing Petitioner’s statement on claim construction). Thus, for the purposes of this Decision, we are able to determine whether or not the cited prior art teaches this recitation based on what the parties agree the term minimally encompasses.

Petitioner argues that Crane teaches determining the street the phone is most likely located on. Pet. 35–37 (citing Ex. 1004, 3:15–56, Fig. 5; Ex. 1008 ¶¶ 161–162). Patent Owner does not dispute Petitioner’s contentions regarding this recitation. Based on the entire trial record, we agree with Petitioner’s analysis and credit Mr. William’s testimony supporting Petitioner’s position. Thus, in light of the evidence of record, we find that Crane discloses recitation 1.7.

[1.8] determining a first point of said plural points that is in proximity to said first geographic location

As we explain in Section III(C), *supra*, we construe this recitation as encompassing “determining a point of the location information database that is in proximity to the first geographic location” where “in proximity” encompasses “where the ‘first point’ and ‘said first geographic location’ match (*e.g.*, are the exact same location).” Although the District Court determined that the full scope of the claim term “in proximity” “does not inform a [person of ordinary skill in the art] about the scope of the invention with reasonable certainty” (in the context of issuing a ruling as to claim 11), Patent Owner does not dispute Petitioner’s position that, even if the full scope is uncertain, “in proximity” at least encompasses a match. Ex. 1028, 26 (District Court ruling); PO Resp. *passim* (Patent Owner not disputing Petitioner’s statement on claim construction). Thus, for the purpose of this decision, we are able to determine whether or not the cited prior art teaches

this recitation based on what the parties agree the term minimally encompasses.

Petitioner argues that Crane teaches a matching process that involves determining that the phone is on or within a threshold distance of a road and ultimately determining what road the phone is on. Pet. 37–41 (citing Ex. 1004, 3:38–39, 3:59–67, 4:1–20, 4:61–63, Figs. 3, 5; Ex. 1008 ¶¶ 164–178). Patent Owner does not dispute Petitioner’s contentions regarding this recitation. Based on the entire trial record, we agree with Petitioner’s analysis and credit Mr. William’s testimony supporting Petitioner’s position. Thus, in light of the evidence of record, we find that Crane discloses recitation 1.8.

[1.9] entering said first point in said calibration database and associating the location data for the first one of said plural geographic locations determined by said wireless device with the first point

Petitioner argues that Crane discloses entering a first point (corresponding to a wireless device location) into the geographic database to create a new, more accurate database (calibration database) from which additional database products can be derived. Pet. 41. Petitioner further argues that Crane teaches measured location data points being associated with the most likely street as illustrated by Crane Figure 5. *Id.* at 44–46. Petitioner concludes that Crane discloses the recitations of [1.9]. *Id.* at 46; *see also* Ex. 1001, 8:48–54, 8:63–9:2 (’784 patent explaining generation of calibration database and use of a wireless device for database generation); Ex. 1004, 3:15–63, 4:9–14, 4:52–55; 4:66–5:3, 5:52–53, 6:62–65, Figs. 3–5; Ex. 1008 ¶¶ 179–195.

Patent Owner does not dispute Petitioner's contentions regarding this recitation. Based on the entire trial record, we agree with Petitioner's analysis and credit William's testimony supporting Petitioner's position. Thus, we find that Crane discloses recitation 1.9.

Summary for Claim 1

In summary, we determine that Petitioner has established by a preponderance of the evidence that claim 1 is unpatentable as obvious over Crane and Spain.

b. *Claim 12*

Claim 12 is a system claim that is similar to method claim 1. Ex. 1001, 9:17–43, 10:9–34. Petitioner addresses claim 12 in a similar manner to claim 1. Pet. 48–50; *see also* Ex. 1008 ¶¶ 224–242. Our reasoning with respect to claim 12 is also substantially the same as our analysis with respect to claim 1. Patent Owner does not separately dispute Petitioner's position as to claim 12. *See* PO Resp. *passim*.

Petitioner has established by a preponderance of the evidence that that the combination of Crane and Spain teaches or suggests all limitations recited in claim 12 and that a person having ordinary skill in the art would have reason to combine the references' teachings with a reasonable expectation of success in the manner Petitioner proposes. We thus determine that claim 12 is unpatentable as obvious over Crane and Spain.

c. *Dependent Claims 2, 10, 13, 21, and 22*

Claim 2 depends from claim 1 and recites "wherein said attribute is selected from the group consisting of: signal strength, Cell global identity, broadcast control channel, base station identity code." Ex. 1001, 9:44–46. Petitioner cites Spain teaching "signal strength" as an attribute and provides

evidence that it would have been obvious to implement this attribute for determining location. Pet. 46–47 (citing Ex. 1005 ¶ 41; Ex. 1008 ¶¶ 197–198, 255).

Claim 10 depends from claim 1 and recites “wherein said location database is a street database.” Ex. 1001, 10:5–7. Petitioner cites Crane as disclosing, for example, “a road network 155 [] represented by data 170 in a geographic database 172.” Pet. 47 (citing Ex. 1004, 3:37–38, 45–47; Ex. 1008 ¶¶ 200–203).

Claim 13 depends from claim 12 and recites “wherein said attribute is selected from the group consisting of: signal strength, Cell Global identity, broadcast control channel, base station identity code.” Ex. 1001, 10:34–37. Petitioner’s position is similar as its claim 2 position. Pet. 50–51.

Claim 21 depends from claim 12 and recites “wherein said location database is a street database.” Ex. 1001, 10:60–61. Petitioner’s position is similar to its claim 2 position. Pet. 51.

Claim 22 depends from claim 12 and recites “wherein said status includes attributes selected from the group consisting of: direction of travel; speed of travel, and change in direction of travel.” Ex. 1001, 10:63–65. Petitioner refers back to its analysis of claim 12 wherein Petitioner cites evidence showing that Crane discloses rate and direction of travel as status. Pet. 51–52; *see also* Ex. 1004, 4:27–34; Ex. 1008 ¶ 252.

Other than its argument for independent claim 1, which we address above in Section III(F)(a), *supra*, Patent Owner does not raise additional arguments for these claims. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378. We have reviewed Petitioner’s arguments and evidence, summarized above, and

we find them persuasive and supported by the evidence. Therefore, having considered the full record developed during the trial, we conclude that claims 2, 10, 13, 21, and 22 are unpatentable as having been obvious over the combined teachings of Crane and Spain.

IV. CONCLUSION⁸

For the reasons above, we determine that Petitioner has proven, by a preponderance of the evidence, that claims 1, 2, 10, 12, 13, 21 and 22 of the '784 patent are unpatentable as summarized in the following table.

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 2, 10, 12, 13, 21, 22	103(a)	Crane, Spain	1, 2, 10, 12, 13, 21, 22	
Overall Outcome			1, 2, 10, 12, 13, 21, 22	

We do not address the merits of claim 11 because that claim has previously been determined to be unpatentable with finality.

⁸ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

V. ORDER

For the foregoing reasons, it is

ORDERED that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, 10, 12, 13, 21 and 22 of the '784 patent are unpatentable;

ORDERED that the Petition as to claim 11 is dismissed as moot;

ORDERED that *inter partes* review as to claim 11 is terminated; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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For PETITIONER:

Patrick Keane
Roger Lee
Matthew Fedowitz
Andrew Cheslock
Mythili Markowski
Samuel Harrod
Ralph Fischer
BUCHANAN INGERSOLL & ROONEY PC
patrick.keane@bipc.com
roger.lee@bipc.com
matthew.fedowitz@bipc.com
andrew.cheslock@bipc.com
mythili.markowski@bipc.com
samuel.harrod@bipc.com
ralph.fischer@bipc.com

For PATENT OWNER:

Ryan Singer
SCHULTE ROTH & ZABEL LLP
ryan.singer@srz.com

James Carmichael
Stephen McBride
Minghui Yang
CARMICHAEL IP, PLLC
jim@carmichaelip.com
stevemcbride@carmichaelip.com
mitch@carmichaelip.com